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EDITORIAL

THE POT BOILS.

There is room for much reflection and more philosophy in the study of the economic state of the civilized world at this time. Conflict has held place for most of a decade and is still fermenting everywhere. The aftermath of the greater war has split the peoples into smaller and greater struggles—national, international, and civil. Anarchy rears its foul head in menace and organized society is not yet potent enough to strangle it. The outcome is in the balance.

Meanwhile there is a steady current of reform winding among the foul eddies of revolt and the pure minded are still creating

and fostering ideals of living for the salvation of the benighted and for the weak. Organized crusades against vice and its corollaries are in actual progress and the governments of this and other countries are operative in such movements. The improvement of the economic and social states of the whole people is being discussed along practical lines. Child welfare, social surveys, health insurance and domestic hygiene, including mental habits are among the harbingers of a better day.

Meantime the unrest among all kinds of people has created an excrescence of worldly and of world resentment against organized society, through which an unreasonable and intemperate attack upon society has been made by the former parasites of modern civilization, joined to the malcontents who hope to profit by their neighbors' efforts.

No judicial mind may prognosticate the outcome, but the experience of time has levelled the unrighteous and it is fair and right to assume that the adjustment of society to sane living will come when predatory wealth has been disciplined and when the froth of unrest has settled.

The pot must boil until the mass of unassimilable forces has been brought into homogeneity and then society may again rise to the problems of new ideals.

NEW PLANS FOR THE ARMY MEDICAL CORPS.

A recent circular proposes to accept graduates of recognized schools, who have attained a college grade of not less than 85% and to commission them as first lieutenants in the Army Medical Corps after a qualifying physical examination. They will then be admitted to the government hospitals, as internes, with pay at $60.00 per month, with limited military discipline, and no military restrictions and without the privilege of pension while in such hospital service.

The training proposed is far and above any interne positions offered in any hospital in the United States, with a division of services and under such directions as will insure proper attention to all duties involved.

This move on the part of the Army, and of the Surgeon General in particular, should attract recruits to the Corps, in which there

are now many vacancies. The navy early in 1917 brought in a large number of high grade men by adopting a similar plan and it is gratifying to see that the Army has fallen in line. The standardizing of first class medical schools, under the regulation of the council of the A. M. A. and of the association of American Medical Colleges, should make it certain that the better graduates of such schools should be qualified without further examinations, and examinations of a sort which have hitherto deterred applicants for the Army. This plan should be rewarded by many applicants from the schools now standing for first class instruction.

ORIGINAL ARTICLES

(No paper published or to be published in any other medical journal will be accepted for this department. All papers must be in the hands of the Editors on the tenth day of the month preceding that in which they are expected to appear. Reprints may be had at reasonable rates if a WRITTEN order for the same accompany the paper.)

POLLENS IN THEIR RELATION TO HAYFEVER.*

By WILLIAM SCHEPPEGRELL, A. M., M. D., New Orleans.

President, American Hayfever Prevention Association; Ex-President, American Academy of Ophthalmology and Otolaryngology; Chief of Hayfever Clinic, Charity Hospital.

Importance of Correct Knowledge.

The relation of pollens to hayfever is important both from a prophylactic and therapeutic standpoint. In the former, it is necessary to know the plants that are responsible for hayfever, so that intelligent measures may be undertaken for their control, including the enactment of proper legislative measures. In the treatment, the lack of knowledge regarding the specific pollens responsible for cases of hayfever results in erratic efforts of immunization.

In its relation to preventive measures, the erroneous idea that the golden-rod, daisies, lilies of the valley, and other harmless plants,[1] are responsible for hayfever, as stated in many of our text books and encyclopedias, prevents effective measures from being instituted for its prevention. The correct knowledge that the majority of hayfever pollens are generated by worthless weeds, that have already been condemned by the farmers, tends to encourage public cooperation for its control.[2]

In the treatment, the use of the wrong pollen extract is responsible for many of the cases of failures in immunizing methods. Last June, a well-known rhino-laryngologist complained of lack of benefit in a case of hayfever which he was then treating, and was surprised when informed that the ragweed extract, which he was injecting, not only could not immunize the patient who had hayfever in June, which could not be due to the ragweed which

1. Our Harmless Flowers and Hayfever Weeds, W. Scheppegrell, M. D. Interstate Medical Journal, February, 1919.

2. A Year's Work in Hayfever Prevention in the United States. W. Scheppegrell, M. D. American Journal of Public Health, Volume 7. No. 2.

*Read before the Orleans Parish Medical Society, February 9, 1920. (Received for publication March 11, 1920.—Eds.)

blooms in August and September, but might even induce a sensitization to the fall hayfever.

POLLINATION.

Pollen is the male element of flowering plants. It is formed in the anther, but must be deposited on the stigma, where the pollen may germinate, and grow down the style until it reaches the ovule, in order to complete the process of germination.

In perfect flowers, in which the pistils and stamens are almost touching each other, pollination is easily effected. There are many plants, however, in which the pistils and stamens are on separate flowers, and even on separate plants, such as the persimmons, willows, ragweeds and grasses, and in these cases, pollination is much more difficult.

Pollens are conveyed from one plant to another principally by insects or the wind. In the former, the flowers are usually bright-colored or sweet-smelling to attract insects, and the pollens are comparatively few. In the latter, the pollen is without these attractions, and is formed in immense quantities and is very buoyant.

The only pollens which can cause hayfever are those which are carried by the wind, and are therefore in the air. The characteristics of hayfever plants may therefore be summarized as pollens. 1. They are wind-pollinated. 2. Very numerous. 3. The flowers are inconspicuous, without bright-color or scent, and the pollen is formed in great quantities. These are the characteristics of the weeds that are found in empty lots, neglected gardens, and waste land generally.

HOW HAYFEVER PLANTS ARE RECOGNIZED.

All plants having the above qualities are suspicious from a hayfever standpoint. To place them definitely in this class, however, they must stand the biological test. A small amount of the pollen is applied to the nostril of a susceptible subject, or to the angle of the eye, and if this produces a hayfever reaction it completes the test and the plant is added to the hayfever list. This reaction must be capable of being produced not only during the hayfever season, but at any time of the year.[1]

1. Hayfever and Its Prevention. W. Scheppegrell, M. D. United States Public Health Reports. July 21, 1916.

To establish a plant in the hayfever list, therefore, both the botanical and biological tests are required. The botanical test is not sufficient, as many weeds, in spite of being wind-pollinated and numerous and with insignificant flowers, may be harmless because they fail in the biological test.

On the other hand, many plants which pass the biological test do not enter the hayfever class because they are not numerous or wind-pollinated, and therefore their pollen is not in the atmosphere,

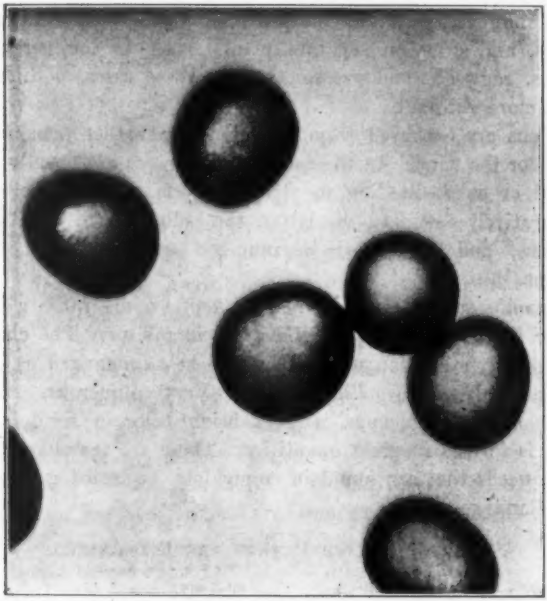


Fig. 1. Pollen of Johnson grass. (Andropogon halapense), fresh from the anther. Magnified 500 diameters.

and cannot reach the nostrils of susceptible persons except by direct contact with the flowers. The failure to include the botanical test has resulted in placing many harmless plants, such as the daisy and golden-rod, in the hayfever list.[2]

2. Hayfever and Its Relation to 100 of the Most Common Plants, Trees and Grasses. W. Scheppegrell, M. D. Medical Record, August 11, 1917.

PROOF OF ETIOLOGIC RELATION.

The proof of the etiologic relation of pollen to hayfever is shown in various ways. Botanically, the pollination, for instance, of the ragweed, the principal cause of fall hayfever in the United States, is synchronous with the duration of this form of hayfever, and the beginning and end of the season may be accurately determined in this way.

The spring-summer hayfever season may also be observed in this

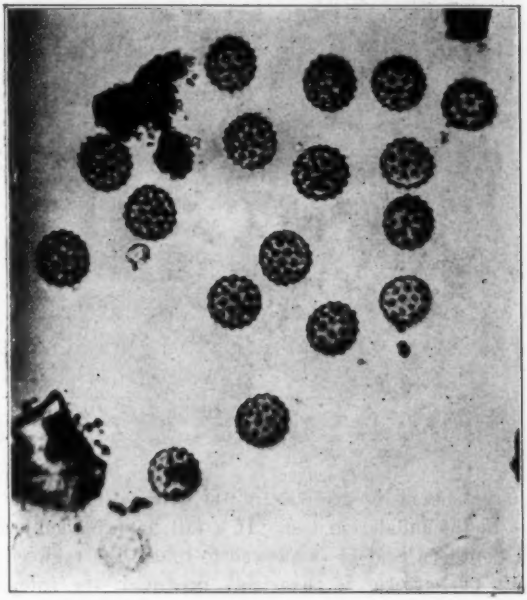


Fig. 2. Pollen of common ragweed, (Ambrosia elatior), from atmospheric pollen plate. The spiculated appearance is characteristic of the Ambrosiaceae group. Magnified 500 diameters.

manner, but the relation is not quite so apparent. The principal cause of this form of hayfever is the pollen of the grasses. These vary from thirty to eighty microns in diameter (Fig. 1.) as compared with fifteen microns in the common ragweed (Fig. 2.), and they have therefore a much more limited potential radius. On account of the buoyancy of the ragweed pollen, it is usually dis-

tributed uniformly over a large area, and the development of the fall hayfever season is therefore fairly uniform. With the grass pollen, however, on account of its lesser buoyancy, the infestation varies greatly in different localities, resulting in considerable variations in the time of the beginning and ending of the resulting hayfever season.

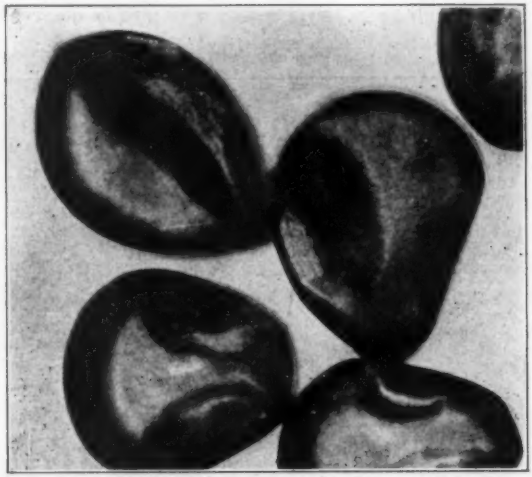


Fig. 3. Pollen of corn, (Zea mays). The large size of its pollens gives corn a restricted potential area in hayfever. Magnified 500 diameters.

The most conclusive evidence of the relation of pollens to hayfever, is in the inhalation test. If a fall hayfever subject (Eastern and Southern States) is allowed to inhale the ragweed pollens, an attack of hayfever is invariably produced, the intensity and duration of the attack depending upon the number of pollens inhaled. Not only may this reaction be produced during the normal hayfever season, but at any time of the year. This is therefore a most convincing evidence of the etiological relation of the pollens to hayfever.

For diagnostic purposes, the test of the hayfever reaction is now made by injecting the pollen extract into the skin, which determines not only the form of sensitization but also its degree.

From a scientific standpoint, the relations of the pollens to

hayfever is most accurately determined by means of the atmospheric-pollen plates. These are glass slides, which are coated with a film of glycerine, and exposed to the wind for 24 hours. They are then stained and traversed in the field of the microscope. The kinds of pollen, and their number, have an accurate relation to the clinical hayfever chart.

In this country, where hayfever weeds are usually found on

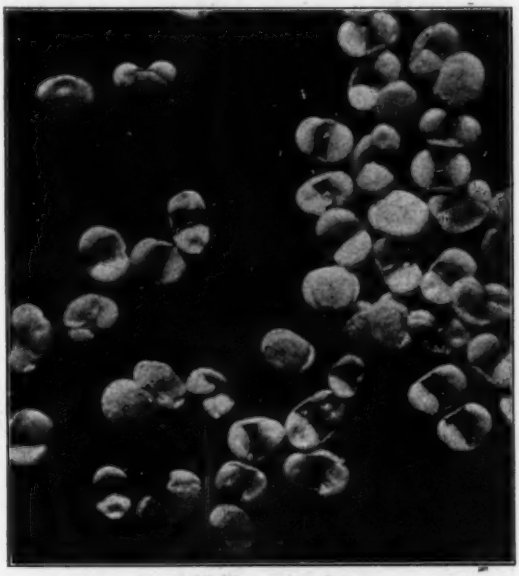


Fig. 4. Pollen of pine (Pinus coulteri), X 125. (Reflected light). The wings enable it to traverse great distances.

neglected farms, the number of hayfever pollens in the air is much greater than in the city. As might be expected, therefore, but contrary to the popular belief, there is a larger percentage of hayfever cases in the country than in the cities. In the Questionnaire of the United States Public Health Service in Louisiana,* it was demonstrated that the class which suffers most from hayfever was that of the farmer, being 38 per cent of all cases! In

*Hayfever in Louisiana, W. Scheppegrell, M. D. New Orleans Medical and Surgical Journal, October, 1916.

a country section of another state, reported to the American Hayfever Prevention Association, nearly ten per cent of all the residents suffer from hayfever.

VARIATIONS IN THE NUMBER OF ATMOSPHERIC POLLENS,

Fig. 5. Giant ragweed, (Ambrosia trifida).

The recurrence of attacks of hayfever, and their intensity, depend upon the number of pollens in the air. This is influenced by (1) the season of the year, (2) weather conditions, (3) meteorological disturbances and (4) the size of the pollens.[1]

1. Hayfever and Hayfever Pollens, W. Scheppegrell, M. D. Archives of Internal Medicine, June, 1917.

(1) Most hayfever plants have a season for their pollination, without which their pollen is not found in the air. Most of the ragweeds, for instance, have their florescence in August and September, and the artemisias in July and August.

(2) The growth of these plants is influenced by weather con-

Fig. 6. Common ragweed (Ambrosia elatior).

ditions. Favorable weather causes an increase in their number and in their growth, with corresponding augmentation of the resulting pollens in the air.

(3) As demonstrated by our atmospheric-pollen plates, meteor-

ologic conditions have a direct relation to the number of pollens in the air. When there is little wind, the pollens fall near the plant, but traverse increasing distances with the increase of the wind velocity. In the case of the common ragweed, *Ambrosia elatior,* a wind of 15 to 20 miles per hour will cause them to travel several miles, with a corresponding radius of infestation.

A local rain has only temporary effect, but a rain over a large area causes a general precipitation of the pollen with corresponding relief from the hayfever pollens.

(4) The size of the pollen has an inverse relation to its potential area. As already shown, the pollen of the common ragweed,

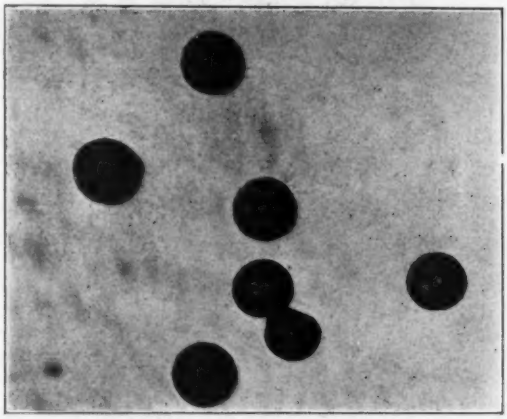


Fig. 7. Pollen of spiny Amaranth (Amaranthus spinosis). The appearance is characteristic of the chenopod group. Magnified 500 diameters.

15 microns in diameter, may travel several miles under favorable wind conditions, while the pollen of the corn (Fig. 3.), which measures 80 microns in diameter, and has therefore almost 800 times the volume of the ragweed pollen, will travel only a few yards from the parent stalk.

The potential area is also influenced by the formation of the pollen. In the case of the spiculated pollens, such as that of the ragweeds, the distance is increased by almost 50 per cent. Pines have winged pollens (Fig. 4.), which enables them to travel great distances. Fortunately, the latter are harmless from a hayfever standpoint.

CLASSIFICATION OF HAYFEVER POLLENS.

In the immunizing treatment of hayfever, if it were necessary to use the pollen extract of each plant responsible for hayfever, it would make it a hopeless proposition. There are several thousand varieties of grasses, for instance, and probably a dozen or more in any given locality whose pollen is in the air at the same time. This applies to a lesser degree, to other hayfever plants.

Fig. 8. Wormwood (Artemisia frigida).

Fortunately, from a biological standpoint, most of the hayfever pollens may be reduced to four groups, which simplifies our immunizing methods.[1] Most of the remaining hayfever pollens are comparatively local, and for these special extracts must be pre-

1. The Treatment of Hayfever, W. Scheppegrell, M. D. United States Public Health Reports, August 1, 1919.

pared. The four groups into which we have divided the principal pollens from a biological standpoint are, (1) *Gramineæ* (grasses), (2) *Ambrosias* (ragweeds), (3) *Chenopodiaceæ* (chenopods) and (4) *Artemisias* (wormwoods).[2]

1. *Gramineæ.* The biological tests of hundreds of hayfever cases, have shown us that a patient, who is sensitive to one of the grasses, is also sensitive to all other grasses, differing only in

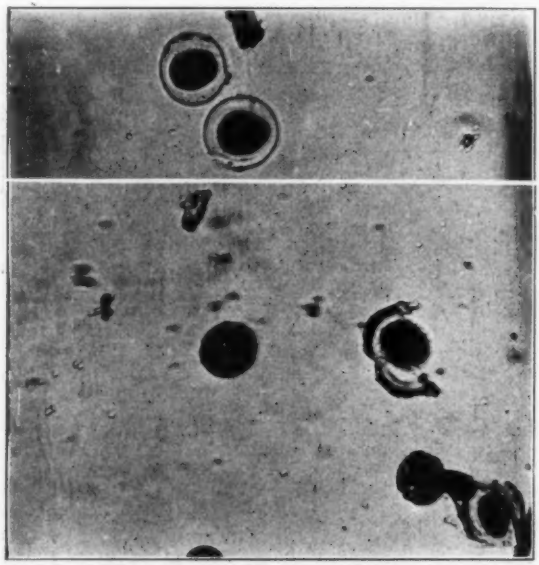


Fig. 9. Pollen of mountain cedar, (Sabina sabinoides). From atmospheric pollen plate, showing expansion of intine and rupture of extine from the glycerine. Magnified 500 diameters.

degree. The extract of one of these, or of several, may therefore be used for immunization to all members of this family.

2. *Ambrosiaceæ.* The ragweed group is an important factor in hayfever in the United States. It includes not only the common (Fig. 5.), giant (Fig. 6.), and western ragweeds *(Ambrosia elatior, trifida, psilostachya,)* but also the *Gaertnerias* (false ragweed), marsh elders *(Iva ciliata, Xanthifolia),* and cockle burs *(Xanthium americanum,* etc.). In some of the Western States,

2. The Classification of Hayfever Pollens from a Biological Standpoint, W. Scheppegrell, M. D. Boston Medical Journal, July 12, 1917.

the development of hayfever has been closely related to the spread of cockle bur. Botanically, as well as biologically, the above belong to the Ambrosiaceæ group, and the resulting hayfever may be immunized by an extract of one of this number, the common ragweed being usually preferred as being most typical.

3. *Chenopodiaceæ.* The members of this group include the amaranths (Fig. 7.), chenopods, achnidas, and dock *(Rumex)* families, and are not as closely related botanically as the other three groups. They have a wide geographical distribution, as some

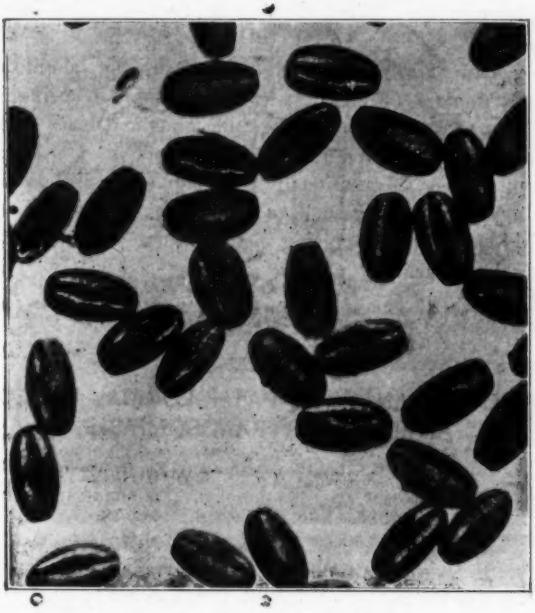


Fig 10. Pollen of live oak. (Quercus virginiana). The ovoid form is common with the tree pollens. Magnified 500 diameters.

members of their families are found in most sections of the United States. The Russian thistle *(Salsola pestifer)* is a prominent member of this group. It was naturalized from Northern Europe or Asia, and is a source of hayfever infestation from New Jersey to Ontario, the Northern Territory, Kansas and Washington.

4. *Artemisia.* (Fig. 8). The 50 or more members of this family form the principal cause of hayfever in the Pacific and

Rocky Mountain States, and the hayfever reaction from these pollens is much more marked than from that of the ragweeds. In Colorado, on the western slope of the mountains, the sage brush *(Artemisia tridentata)*, covers vast areas almost to the exclusion of other plants. In this region, there is a great deal of "mountain fever" from August to October, which we have shown to be a form of hayfever, and due to the pollen of the *Artemisia tridentata.**

By using extract of each of the above four groups, most cases of hayfever in the United States may be treated by immunizing methods.

The pollen of some of the trees, such as the mountain cedar, *Sabina sabinoides* (Fig. 9.), a common cause of spring hayfever in northern Texas, the oaks (Fig. 10.) elms and black walnut, are responsible for hayfever in localities where they are found in sufficient number, or occasionally from single trees in close proximity to a residence. These have not yet been classified into any special groups, and immunizing methods therefore depend upon the individual pollens.

*Hayfever and Its Prevention in the Rocky Mountain and Pacific States. W. Scheppegrell, M. D. United States Public Health Reports, July 21, 1916.

CLINICAL AND ANATOMO-PATHOLOGICAL ASPECTS OF AMERICAN TRYPANOSOMIASIS.*

By CARLOS CHAGAS, Osvaldo Cruz Institute, Rio de Janeiro, Brazil.

Translated for the NEW ORLEANS MEDICAL AND SURGICAL JOURNAL by LODILLA AMBROSE, Ph. M., New Orleans.

[125] PART I

At the beginning of this lecture I take pleasure in acknowledging my special indebtedness to Doctor Araoz Alfaro, the well known Argentine pediatrist, for to him I owe the opportunity of presenting to this meeting one of the subjects of major importance in South American pathology. Further, we students of Osvaldo Cruz hold in grateful remembrance this Argentine master. He has known how to make current in the scientific world of his native land a just appreciation of the scientific work of that eminent Brazilian, Osvaldo Cruz, and of his school of investigators.

* Chagas, Carlos. Aspectos clínicos y anátomo patológicos de la tripanosomiasis americana. Prensa médica argentina, Buenos Aires, 1916, iii, 125-127, 137-138, 153-158. [Pages of the original article are given in square brackets.]

Chagas

We will not indulge in unnecessary repetitions, but will turn to the discussion of essential aspects of American trypanosomiasis. Since the publication of the first facts, we have gained new and exact information which assists us to better reasoning regarding previous interpretations and to description of the disease as a definitive etio-pathogenic concept. Working in regions of high endemic index, that is, in those most infected in our country by the transmitting agent, we possess today an immense fund of clinical and experimental data which constitute an abundant documentation for our studies. We can, thus, present for your judgment numerous examples of all the aspects of the disease, of all the manifestations verified in it,—examples collected during a long clinical observation and in laboratory studies which constitute a guarantee for our conclusions.

It is with sincere pleasure that we consult the works of Kraus, Rosenbusch and other Argentine investigators of this subject. We commend their safe methods and capacity for technic and observation. With their aid we hope for the ultimate truth in matters which may have escaped solution in our own studies. Without doubt we shall succeed in clearing up some points still obscure in this interesting chapter of human pathology. And even if there may exist between their interpretations and ours differences of small import, these will still be precious in continuing the work in hand, orienting our researches in better direction, indicating the selection necessary between the appearance and the reality in the ascertained facts.

We trust still more,—in this as in other subjects of medical experimentation,—in the results of your labor. We shall have solidarity in our guiding objective, truth, and we shall know how to applaud with enthusiasm your conquests.

Considering the natural limitation of time, we are obliged to restrict ourselves in the expository part of this lecture to the minimum compatible with the synthetic and clear idea of the facts. We shall study to confront the subject in its general outlines, but [126] with sufficient detail not to obscure the essential clinical conception of the disease. We intend now with all earnestness to delimit exactly this trypanosomiasis, defining its undeniable qualities, formulating and establishing by observations and decisive experiments that general physiognomy which individualizes it in the nosologic picture. And if in the history of this disease there

exist doubtful aspects, indecisive interpretations resulting from varying theories, we shall take up these and other allied problems and discuss them separately in the light of arguments which seem to us of value. However, such aspects do not nullify the exact conception of the trypanosomiasis, whose multifarious symptomatology is based on numerous anatomical confirmations, which explain well the etio-pathogenic processes in this entity and give it undeniable clinical autonomy. No matter about the remaining doubtful points: the trypanosomiasis ought to be defined in those constant etio-pathogenic and symptomatic aspects which are fundamental to it, and make of it a human disease with one of the best determined clinical histories.

Under this criterion we proceed to report on the disease.

Taking into consideration the parasitic and etio-pathogenic conditions of this trypanosomiasis, we can admit in it two distinct developmental phases related chiefly to the localizations of the parasite. In the first phase, that of recent infection, the trypanosome is found in the circulating blood; in the second, that of chronic infection more or less remote, the parasites disappear from the periphery and remain in activity in the interior of the tissues, or better said, in the interior of the anatomic elements, even of those most differentiated.

The clinical facts of the first group constitute the acute form of the disease; those of the second, the chronic form. In the first case the protozoan (protozoario) is found in the plasma under the aspect of flagellates, and its verification is easily realized by the direct examination of the peripheral blood. In the definitive chronic forms, on the contrary, the examinations of the blood as also the inoculations in sensitive animals, nearly always fail to reveal the parasite, verifiable then only at autopsies.

In the acute forms there is a sufficiently exact relation which exists between the number of the flagellates and the intensity of the morbid elements. The clinical cases which present the greater number of parasites are always more grave, and owing to the constancy of this fact it is possible to foresee the lethal end, when the trypanosomes are numerous in the blood examined. In the patients with few parasites, on the contrary, there can with certainty be prophesied the progressive attenuation of the symptoms and the subsequent chronic evolution of the disease. In general, the flagellates remain in the circulation and increase in number there

as long as the acute signs of the disease persist. When these have become attenuated, the parasites also diminish up to the point of disappearing completely from direct examination. According to our observation in the great majority of clinical cases we can find flagellates in the blood only during a period of less than thirty days; and in many patients after eight or ten days the most protracted examinations of fresh blood are negative.

The presence of the protozoan in the circulating blood is, therefore, transitory, observed only in the initial phase of the infection —a fact, this which constitutes in the parasitic diagnosis of the disease a difficulty not a few times unconquerable.

When the acute phase of the trypanosomiasis has once passed, and the signs which characterized it have become attenuated, then the flagellates disappear from the periphery and remain in the tissues. There the protozoan presents itself under the aspect of non-flagellate Leishmaniform corpuscles (corpúsculos) in the interior of the anatomic elements.

This is a biologic adaption of the protozoan which conditions its long persistence in the organisms attacked by it. Sheltered in the innermost parts (intimidad) of the tissues, protected in this manner from the injurious influence created in the blood-medium by reactionary procedures, the trypanosome does not undergo natural destruction, and the disease is not capable of spontaneous recovery. In the infected individuals the parasite survives indefinitely, exerting a pathogenic action more or less attenuated up to the point of the extermination of the life. The infections are prolonged through an entire existence: patients whose onset of morbidity is referred to the first months of extra-uterine life, live up to an adult age; and, when death has taken place as a consequence of this same disease or of some other intercurrent factor, the parasite appears in its habitual localizations.

It is in the tissues that this trypanosome is multiplied; in this one the binary division in the blood (true for other species of the same genus) is not observed.

The parasites of the tissues undergo a continuous development, and, transformed from Leishmaniform corpuscles into typical trypanosomes, they return to the blood. This process, the progressive increase of the flagellates in the circulation, is more intense in the acute infections. In the chronic forms, undoubtedly, this cycle takes more time; yet, according to the results of distinct investi-

gations, here also it happens that there are demonstrated in the tissues along side of the non-flagellate parasite, transition-forms and others with the typical morphology of trypanosomes. If this is so, if the forms form the innermost part (intimidad) of the anatomic elements come to the blood flagellate, how shall we explain the fact of the absence of the parasites from the circulation in the chronic forms of the disease? How shall we explain this fact, when the autopsies of an increased number of chronic patients—in whom all the investigations during life have been ineffectual for demonstrating the protozoan in the blood—have revealed it in abundance in the tissues? This aspect of the chronic disease is comprehensible, that is, admitting in it a relative immunity of the blood established since the acute phase of the infection. The result of this immunity is the appearance of antibodies which make impossible or at least difficult the life of the trypanosome in the blood; because of this the parasites which come from the tissues to the circulation are very promptly destroyed by the elements of the organic defense, or else return to the initial localization and there are able to continue their vital cycle. Likewise in the acute infections the disappearance of the flagellates from the blood will be due to this biologic reason: by the reactionary procedures in the infected organism there is established a condition injurious for the protozoan in the blood-medium, in which, as we have seen, its continuance is transitory, limited naturally by the progressive increase of the immunity referred to.

Of the localizations of the *Trypanosoma Cruzi* in the tissues and of the histo-pathologic processes caused by this trypanosome, those of most pathogenic import deserve here detailed reports.

Some organs and systems of organs constitute localizations of choice, and among these, because of their high rank in the vital functions we should mention the cardiac muscle, the central nervous system, and the various glands of internal secretion. In the myocardium the trypanosome penetrates into the very fibre, where it multiplies forming great agglomerations of parasites distributed all through the muscular tissue of the organ. This localization is perhaps constant; at least we have always found it in all the autopsies of acute cases and in a great number of chronic cases; further, in the experiments on laboratory animals, after the incipient phases of the infection, the cardiac muscle is found to be infected with parasites (parasitado).

In this exceptional parasitic aspect of the disease, characterized by the attack of the germ on the anatomic element which constitutes in the organ the essential substratum of function, we are going to encounter a great quantity of indications serviceable for clearing up cardiac physio-pathology. Having recognized the exact nature of the functional alteration, having studied the semeiotics of the cardiac phenomenon, we shall be able from now on to refer its pathogenesis to constant anatomic conditions easily verifiable in autopsies. And in this manner will be determined the immediate reaction between the morbid phenomenon and its cause, which in its possible generalization, will throw great light on many obscure problems of the pathologic physiology of the heart.

As a consequence of the action of the protozoan, there are verified more than a few times in the myocardium histo-pathologic processes of great intensity. The cardiac fibre is destroyed, many times becoming reduced to a membrane within which persist the Leishmaniform corpuscles; or in other cases the membrane may be ruptured lodging the parasites in the interstitial tissue. In this case are observed intense inflammatory processes diffused through the whole thickness of the myocardium.

In some of our autopsies the alterations have been found in the degrees of greater intensity betraying themselves not only by the disintegration of the cardiac cells, but chiefly by the lesions of the connective tissues. And not infrequently these processes are demonstrated in such intensity that the general structure of the cardiac muscle is completely modified.

In the acute cases with lethal termination, we have also observed the constancy of the pericarditis; this in a varying degree constitutes an almost constant pathologic fact of trypanosomiasis, and results from the polyorrhomenitis, which is one of the anatomic characteristics of the disease. Not a few times there exists in the cavity of the pericardium a more or less abundant accumulation of liquid (derrame), lemon-yellow, with the reactions of true exudate.

The central nervous system in acute and chronic forms of trypanosomiasis is also the frequent site of parisitic localizations and of well defined histo-pathologic processes.

As shown by repeated findings, the cell of neuroglia is the only anatomic element affected initially. While still flagellate the protozoan penetrates it, and is multiplied in the interior of the plasma under the aspect of Leishmaniform corpuscles. In this manner

the cell is destroyed, and the parasites remain free, constituting isolated agglomerations in the nervous substance.

Sometimes the infiltration of leukocytes is begun when the protozoa are found still in the plasma of the cells of neuroglia, which in this case is observed between the spherical elements; but not infrequently the infiltration is effected only after the parasites have been set at liberty and the cells obstructed which served them as the initial focus. In the foci thus constituted, if they are recent, parasites are still found, but those soon disappear, and there remain only the infiltrated anatomic elements which constitute scattered foci, points for the onset of processes of cerebral sclerosis and subsequent definitive degenerations.

In all the regions of the neuraxis, in the gray substance as well as in the white substance, we have found parasitic foci and inflammatory processes resulting from them.

There is no interdependence of the localizations of the protozoan and the vascular system, a fact this which is related to very valuable differential aspects between the syndromes of trypanosomiasis and other etio-pathogenic factors. In the nervous system the protozoan does not act initially on the vascular apparatus, as happens in [127] syphilis and some other parasitic diseases; it is in the nervous substance itself that it is localized in the beginning, and here take place histo-pathologic processes evidenced externally in functional disturbances of great intensity, as we shall see further on.

Among the units of the endocrine apparatus affected by the protozoan and showing histo-pathologic changes more or less pronounced, are the suprarenal capsules, the thyroid gland and the the genital organs.

In the capsules, not only of acute but also of chronic patients, the autopsies have demonstrated parasitic agglomerations of the usual aspect localized in the cortical zone. And as histo-pathologic processes of greater import we have met with foci of hemorrhage and with well defined inflammatory changes. It is worth while to note the considerable reduction suffered by the medullar zone, which in the majority of patients almost disappears.

In the thyroid gland in distinct autopsies of acute cases we have verified parasitic localizations in the vesicular tissue itself. The protozoan penetrates into a cell of the thyroid vesicles, and, as happens in other anatomic elements, becomes flagellated, is

multiplied by successive binary divisions, and thus constitutes agglomerations with sometimes a great number of Leishmaniform corpuscles. The cell primarily affected is destroyed, and with the numerical increase of the protozoan the entire vesicle will possibly disappear.

Notwithstanding its observation in various patients, this localization of the parasite does not represent a fact as constant as is that verified in the cardiac muscle and other organic systems. In other words, the investigation of Leishmaniform corpuscles in the thyroid does not present the same facility which we realize in other tissues. In this case the parasites are not very abundant, even in the patients who show numerous flagellates in the circulating blood. Can this be explained by the special conditions of the structure of the gland, which is constituted of numerous vesicles in which the protozoan is scattered? Or is the gland in view of its abundant vascularization a favorable focus for long persistence of the trypanosome? Be that as it may: either by the direct irritative action or by means of its toxins, the protozoan acts on the thyroid and determines in it changes which we will describe presently.

In the testicles of man has been observed the presence of the protozoan, and this localization is common in the small laboratory animals. We will make the same statement in regard to the ovaries, in which in some cases of acute infection terminated with death the parasites have been found. These principal localizations of the protozoan thus rapidly reported have a direct reaction in the clinical aspects which we are about to describe.

PART II.

[137] Clinically the acute infections proclaim themselves by an aggregate (conjunto) of constant symptoms which renders diagnosis easy even before the parasitic verification.

Among the morbid elements of the onset of the disease, the fever is one of the most noteworthy for the constancy and intensity of the thermic reactions. Directly related to the presence of the flagellates in the circulation, the fever reveals a predominant action of the toxins elaborated in the blood. Whenever the microscopic examination demonstrates the existence of parasites in the periphery, the thermometer shows thermic reaction, and on the other hand the relation is constant between the intensity of that reaction

and the quantity of the parasites, and consequently the lethal prognosis is possible when the flagellates are numerous in the blood. In the infections with abundance of parasites the thermic reactions reach or exceed 40° C.; in the slight infections in which there is not infrequently difficulty in observing the protozoan the temperature rises little above normal, the patient remaining hardly subfebrile.

In the thermic picture of the grave cases there do not exist even simple remissions, and whenever the parasites are observed in the periphery, the fever appears in the patient. When the flagellates disappear, that is to say, when they pass to the exclusive localization in the tissues, the temperature will possibly continue high for a short period; but presently it returns to normal.

Febrile intermission will possibly be observed in the benign acute forms, but it is not in a constant manner nor does it present a special characteristic of the disease. Here, in contrast with that which occurs in malaria, there exists no relation between the biologic processes of the protozoan and the febrile reactions, this being the reason why we do not observe the alternations of exacerbations and of remissions peculiar to some blood parasitoses, even if we see perhaps the intermitting of greater or less phases of apyrexia.

The disappearance of the fever delimits in the clinical concept the acute phase of the disease. The chronic patients are apyretic, or at most transitory febrile accidents present themselves.

Among the symptoms the increase in the volume of the spleen possesses here value for the clinical diagnosis. The splenomegalia is as constant in this disease as it is in malaria, and in most cases the viscus presents itself as palpable below the costal border with more than its normal dulness. The same may be said with relation to the hepatomegalia, which is nearly always considerable in the acute forms. Further, the liver, although it does not constitute a focus for the [138] localization of the protozoan, is attacked by intense steatosis which transforms it into a great mass of fat comparable in aspect to that which yellow fever determines, and to that which other entities of more notable steatosing action determine. Without doubt the toxins predominate in the pahtogeny of this process which in the local absence of the parasites would otherwise remain incomprehensible.

One of the most frequent, if not constant, symptoms in the acute forms of trypanosomiasis is myxedema.

When we have the anamnesis for the cases of this nature, we obtain the quite exact report of the time when—some days after the onset of the fever—the patients began to swell, were found tumefied, with face increased in size, with eyelids swollen, lips thickened, tongue bulky and soft, etc. This swelling, most accentuated in the beginning in the face, is rapidly generalized throughout in the clinical picture. When the fever has disappeared and the other acute elements have become attenuated and the flagellates have disappeared from the peripheral blood, the edema goes on diminishing up to a certain degree in which we note the features of the patient as scarcely swollen. This is the general rule verifiable in almost the totality of the acute forms which pass to the chronic condition at the end of twenty or thirty days; without doubt we ought to report the exceptional cases in which the greater intensity of the respective pathogenic processes determines a persistence of the accentuated myxedema during a greater or less, if not definitive, period of time.

No doubt can exist concerning the nature of this swelling: minute examination shows that it is a question of a hard edema with elastic consistency, and that it does not hold the impression of the finger which presses it, crepitating under compression in favorable regions. In a subsidiary manner the examination of the urine excludes the hypothesis that it may be a renal edema, all of which could be set aside on the evidence of the other symptoms. The histologic sections of the subcutaneous tissue by their specific staining also demonstrate the mucoid nature of the infiltration. It is undoubtedly a question of a myxedematous infiltration, and in the acute forms the said symptom is characteristic to such an extent that it authorizes immediate diagnosis of the disease even without further investigation. In the majority of the acute forms that we have observed, it has been possible to foresee the positive result of the examination of the blood solely from the myxedematous aspect of the feverish patients. And it is proper to state also, that in these patients previous to infection there was nothing that would possibly indicate myxedema. Our patients were infants of a few months of age, or at most in the first years of life, in condition of perfect health with absence of any morbid symptom whatsoever. The infiltration of myxedematosis began days after the infective process was revealed by the fever, and constituted according to all the indications a symptom of the disease. Along

side of the mucoid infiltration in such cases, existed other elements to characterize the myxedema: brittle hair, falling of the hair, dry skin, exfoliation of the epidermis, secretory endocrine disturbances, etc. Thus then the myxedema of acute form,—with this developmental aspect, appearing days after the primary symptoms of the infection and progressing in exact parallelism with the other morbid elements,—constitutes an aspect very peculiar to this disease (perhaps belonging exclusively to it, never observed in any other pathologic entity of man with the characteristics here reported). Certainly some infections can determine a thyroid insufficiency, and so place the patient in a condition very close to that which we are discussing; but in them the process is slow, of delayed evolution, and the syndrome does not attain the degree of intensity observed in trypanosomiasis. It might be said that in this it is a question of acute myxedema, comparable in its course to the consequences of total thyroidectomies.

How shall we interpret this syndrome of the disease? The myxedema is a pathologic equivalent of functional disturbance of the thyroid gland, and its presence in trypanosomiasis indicates without doubt a specific action of the parasite or of its toxins on that organ, inducing insufficiency.

Continuing, shall we be able to determine the exact mechanism of this action? The facts obtained do not yet enable us to do this, which, however, does not cause remote difficulty in our reasoning, nor diminish the reality of our conclusions. The reasoning is oriented by the observation of irrefutable facts, the conclusions are based on principles of pathologic physiology quite above differences of opinion. We have confirmed the localization of the protozoan in the gland, where it is found in the vesicular parenchyma, destroying it under the aspect of Leishmaniform corpuscles. Is it the direct irritative process of parasitic localization which determines the hypothyroidism? Or is the cause of the process the toxin originating in the parasite? We have as a correlated fact the intense steatosis of the liver, an organ in which notwithstanding we do not verify parasite localizations. This hypothesis agrees better with the difficulty which at times is encountered in verifying protozoa in the thyroid.

The mechanism of the process does not concern us essentially: the *Trypanosoma Cruzi* acts on the thyroid gland, either by direct action or by toxins, causing its functional deficiency.

We will not give a minute description of the histo-pathologic processes studied in the thyroid. We will limit ourselves to demonstrating them in our lantern slides.

As initial histo-pathologic changes we have observed in different glands from acute cases the following facts, which will be demonstrated in lantern slides and microscopic preparations:—proliferation of the cells of the follicle from whose borders are detached epithelial prolongations, which in the beginning communicate extensively with the lumen of the original follicle and later lose this connection constituting new follicles in which are established the fact of colloids. The structure of some follicles in determinate regions is altered. The epithelium is invaginated like a glove finger, and thus become constituted some prolongations in form of tubes which present salients in the lumen of the follicle, the general aspect being that of a tubular gland. The cells have characters which distinguish them from the normal glandular parenchyma. They are more densely congregated, the nucleus is stained crimson in an exceptionally intense manner owing to the greater abundance of chromatin content, the cells are to be seen as recently formed anatomic elements. Cells with such characteristics go on accumulating in the lumen of the follicle, so that the colloid disappears and very soon it is impossible to recognize in the said cellular accumulations the normal aspects of the glandular parenchyma. They are cells with strongly chromatic nuclei grouped in nodules which form salients in the connective trabeculæ. These histologic conditions betray the initial foci, well known, constituted of nodose stroma (estroma nudoso), characterized principally by the appearance and subsequent development of an adenoma in the gland. These are in outline the histo-pathologic facts. From the clinical point of view the evidence is absolute: the myxedema of the acute forms does not constitute an isolated phenomenon; on the contrary, it figures in all the clinical cases, and is positively an integral part of the symptomatology in this first phase of the disease. In the present state of the knowledge of the physio-pathology shall we be able to explain the syndrome without admitting the specific action of the parasite on the thyroid gland? This hypothyroidism of the acute forms indicates in a decisive manner the participation of the thyroid in the pathogenic processes of the trypanosomiasis. If this is not so, how are the facts to be interpreted? It is possible to argue in the

following manner: in the zone where trypanosomiasis abounds miopragia hereditaria exists, and this in the event of the infection would be merely aggravated—hence the appearance of the myxedema. Contrary to this reasoning we would account for the absence of the myxedema, that is to say, for the aggravation of the supposed glandular miopragia by other diseases which exist in the region, malaria, ankylostomiasis, exanthematic fevers, pneumonia, etc. Is trypanosomiasis alone capable of causing the appearance of that latent hypothyroidism?

Part III.

[153] In this case the disease has a specific action on the gland, and—in good logic, withdrawing the arbitrary hypothesis, remaining in the exclusive dominion of the facts—we believe it more reasonable to admit the hypothyroidism as the exclusive function of trypanosomiasis. This is the estimate reached from the morbid cases.

In the acute forms, therefore, the myxedema figures as a frequent if not constant syndrome. The most natural deduction from this fact of the clinical order is, that there is interference with the thyroid because of the functional deficiency in the morbid picture. And here is what observation teaches us, but this does not imply confusing nor much less identifying the acute trypanosomasis with myxedema and endemic goitre. We observe the myxedema in almost the totality of the acute clinical cases, and we declare it in the symptomatology, but in addition to this other symptoms figure to characterize the disease and to differentiate it with absolute clearness from any other nosologic entity whatsoever.

Does myxedema exist, or not, in the acute forms? Certainly it does. Then how omit expressing the fact in the study of these patients? The acute forms can be recognized clinically from other symptoms, and even by those who—from the doctrinaire point of view—may deny specific action of the trypanosome on the thyroid and would make of the myxedema in the acute forms a simultaneous condition, also by those who consider the myxedematous infiltration of our patients due to another etio-pathogenic factor. Even so, there exist other elements to individualize the disease in its first developmental phase. So that then, reporting the myxedema in the acute forms, we place ourselves exclusively in

the clinical point of view without prejudicing the theoretical conceptions relative to the etiology of endemic goitre.

As exceptional symptoms, we ought also to report in the semeiotics of the acute forms inflammatory reactions in the eyes. Conjunctivitis may be observed; but keratitis is more characteristic, reproducing the symptoms observed in the experimental infections. From this with the presence of secondary pan-ophthalmias, may result the loss of the eyeball, as we have had the opportunity to observe.

Very frequently in the acute forms there is photophobia, not rarely persistent, causing great suffering to the patient. What is the reason for the ocular changes? Up to the present time we do not possess studies that explain them, which is our reason for proceeding with investigations of the material mentioned.

[154] As the testicle is attacked by the parasite, orchitis is frequent in the acute forms in man, and not a few times persists, even when the other elements of the infection have bcome attenuated. Will sterility possibly result from this? We do not possess data for considering as frequent this consequence of the parasitic action in the testicles; on the contrary, from the observations made it seems that the genital functions of the man do not in most cases suffer notable change, undoubtedly because the histopathologic processes of the testicles are limited to the initial acute inflammatory reaction without subsequent degenerations of great importance.

The facts of isolated observation show cutaneous processes, sometimes burning, in the acute infections. In one of our patients it was a question of many obscure intercallations with erythematous vesicles scattered over the entire superficies of the skin. Another case presented gangrenous plaques which became detached leaving the subjacent tissues exposed. In regard to these cutaneous manifestations as related to the pathogeny we are unable to advance any hypothesis.

Having thus characterized in a general way from the symptomatic and parasitic point of view the acute form of the trypanosomiasis, we are going to proceed in an identical manner to the analysis of the chronic forms.

The morbid elements which are typical in the acute phase of the disease have been attenuated or modified, the thermic reaction has disappeared, and flagellates are no longer observed in the circu-

lating blood—but for all this the pathogenic action of the trypanosome will not have ceased. The spontaneous recovery—the evolution being limited to the cases that escape death in the acute period—is not realized, for which reason all those infected pass to the condition of chronic patients. Further, distinct observations indicate, that the trypanosomiasis may present itself under the aspect of chronic infection without the great, excessive symptoms of the acute phases. This happens most of the times in adults recently arrived in the infected regions. In these people, the first phase of the disease will be revealed by transitory thermic elevations, by a subfebrile state which many times escapes clinical detection, or no acute element is observed, and little by little go on presenting themselves the symptoms which announce the chronic infections.

In the clinical manifestation of the chronic disease are better evidenced and defined great symptoms, which betray anatomic lesions and parasitic localization in the various organic systems. Of these symptoms some predominate in such manner in the general symptomatology of the trypanosomiasis that they give it a special aspect and establish well the differentiation of distinct clinical forms. This has been the criterion which we had when we were systematizing the disease in the first publications. At the present time, instructed by more extended observation and by the minute analysis of an increased number of cases, we interpret in another manner some variants of the infection; or, at least we systematize it on another basis. But we cannot now treat of this topic which will be discussed in a forthcoming publication.

At this moment we prefer to hold in view our principal objective, to report the most important chronic symptoms from the clinical standpoint and from that of general pathology.

Related to the profound alterations of the myocardium due to the localizations of the protozoan, the cardiac syndrome constitutes in this disease one of the most notable symptomatic characteristics and one of the most noteworthy physio-pathologic curiosities. The anomalies of the heart present extreme complexity. Without making minute analysis of the same but only synthetic reports, it is worth while to call attention to the facts that the semeiotic characteristics are always on the side of the cardiac muscle; that in the great majority of the clinical cases there is nothing to lead to suspicion of the lesions in the endocardium

or in the valves of the heart. The cardiopathies of this disease are essentially muscular; in it the affected functions have as substratum the cells of the myocardium,—altered by the localizations of the protozoan, or diverted from their physiologic mechanism by the reactions of the interstitial tissue which serves to support them. This is one of the aspects of major interest from the point of view of the cardiopathy: we find the immediate cause of the functional disturbance in striking anatomic processes, and we can thus make inferences from the concrete case, and also advance inductions for other similar cases of doubtful pathogeny. In this manner cardiac physio-pathology will be able to find in the abundant collection of notions furnished by the semeiotics of trypanosomiasis, the illumination of problems still under discussion.

The functions of the cardiac muscle, which are attacked with greater frequency and in preponderating manner, are those of excitability and those of conductibility. For this reason, the anomalies of rhythm, which are related to those functions, are most frequent. In the syndrome of all the clinical cases, the extrasystoles and the premature systoles of aricular or ventricular origin constitute constant phenomena, and present themselves with variants of most diverse modalities (modalidades) in accordance with the respective anatomic process. This arhythmia is so frequent that we make of it one of the best clinical symptoms for the recognition of the disease.

The arhythmia of the conductibility also is noticeable in trypanosomiasis both for its frequency and its peculiar aspects. In it we observe all the degrees of functional alteration—from the incipient phases expressed in the delay with which the contractile stimulus goes from its origin to the ventricular muscle, up to the complete block with definitive independence between the rhythm of the auricle and that of the ventricle. Between these two extremes there are all the intermediate aspects dependent on the pathogenic conditions of the cardiac syndrome at a given moment.

The attention is arrested by the frequency of the alterations of conductibility in this trypanosomiasis. In this case the symptom does not depend on the age, and it is observed even in children in the first years of existence.

With relation to this fact, which undoubtedly constitutes an exception in cardiac physio-pathology, we possess many observations in which the block—complete heart-block—has been noted in

children of less than ten years of age. Nor do we know any other etio-pathogenic factor which may occasion the symptom with the frequency and the variants of condition verified in this case. This is another pathogenic aspect of the disease which is of very great interest to general pathology.

Characterizing the cardiac syndrome, there figure also anomalies of rhythm in the musculature of the auricle and ventricle, which reveal variable histo-pathologic processes. Thus the perpetual arhythmia betraying auricular fibrillation, the tachysystole of the auricle, the paroxysmal tachycardia,—these constitute aspects relatively frequent in the syndrome which characterizes the cardiac forms of the disease. We should not be surprised at so many anomalies in the functions of the myocardium. From the anatomic point of view, the profound alterations of structure in that muscle which are caused by the action of the protozoan are more than sufficient for their establishment. It would be a wonder if this were not so, in view of the notions now acquired in various autopsies with reference to the histo-pathologic processes observed in an increased number of patients dead from trypanosomiasis. At present we can consider this chapter of the disease definitively illuminated, the data being furnished by the physical semeiotics during numerous clinical observations in many cases of cardiac form.

In the high mortality which this trypanosomiasis causes, the decline of the myocardium is a preponderating factor. Death is most often the result of the exhaustion [155] of the heart, sometimes in progressive asystole more or less retarded, at other times in rapid cases of acute asystole. Still more curious undoubtedly in the clinical history of this trypanosomiasis, is the frequency of sudden death in the cardiac forms of the disease.

In the infected zone, there are but few families that have not lost some one. They die even young, in full activity, in apparently good health. Of this fact we possess abundant observations; patients who die suddenly in our services in the hospitals without our being able to foresee in the physical symptoms so swift a catastrophe. What is the immediate reason of the sudden death in these cases? Acute dilation of the right ventricle by exhaustion of the tonicity of the cardiac fibre, or detention in diastole of the organ by the loss of that function? Syncope of reflex nature connected with the conditions of the myocardium? Or will death be

the direct result of the ventricular fibrillation in some patients with profound disorders of rhythm? These facts will be discussed at a more opportune time, since it is impossible to analyze them here in detail.

Now we will take up the nervous alterations of trypanosomaisis.

In the acute forms of the disease, the action of the trypanosome on the nervous system is manifested by a meningo-encephalitis, which nearly always ends in death. Various autopsies of cases of this nature have demonstrated the localizations of the protozoan in the nervous substance, and have established in a definite manner the exact pathogeny of the inflammatory processes in the recent infections. The same is true of the chronic forms of trypanosomiasis, in which the central nervous system is a frequent focus of pathologic processes which make themselves evident in profound functional changes. With respect to these last in all the aspects of their extreme complexity, we possess at present an increased number of observations, all studied from the clinical point of view, and fully illustrated by histo-pathologic and parasitic examinations *post mortem*. The motility, the intelligence, the speech, etc., suffer also profound alterations which constitute different physiognomies of the clinical forms with predominance of a nervous syndrome. From the developmental point of view, what do the pathologic processes of the nervous system represent in the chronic forms? Possibly histo-pathologic residua of those inflammatory reactions of the acute phase? Or do they represent subsequent localizations of the parasite without the disturbing symptoms which make evident inflammations of the meninges and of the nervous substance? This last hypothesis, without excluding the first, is that which is verified in the larger number of cases, according to distinct clinical cases which we observe and in accord with reasoning whose exposition would be too lengthy. Trypanosomiasis in its nervous manifestations presents a pathogenic evolution similar to that observed in syphilis. In luetism we know that the great nervous syndromes, which likewise indicate localization of the *Treponema pallidum* in the nervous substance, are in general late phenomena initiated in an epoch remote from the primary infection. It is the case of general paralysis, whose etio-pathogeny the works of Noguchi have illustrated. In this late syndrome of lues, we are going to find the treponema localized, at a remote period, in the nervous substance, although in the course of the

successive years no symptom was indicating alterations on the side of the nervous centre. The process of American trypanosomiasis is comparable to that of syphilis, and if in general paralysis the search for the treponema has placed in evidence many times the etiological reason for the syndrome, the same has happened with relation to trypanosomiasis. In this case there is less difficulty in the searches in view of the larger dimensions of the parasite and the ease with which contrast staining can be applied to it. In various autopsies of the chronic forms of the disease, with pronounced nervous syndromes, we observe parasitic foci and inflammatory processes in the brain, which signifies that we have eliminated any objection whatsoever regarding the recognized etiopathogeny of the functional changes observed. It is certain that—in the nervous forms of long standing in which death may have been caused by virtue of the evolution of pathogenic processes of other organs—parasitic foci are not always abundant in the nervous centres, which fact not infrequently renders difficult their observation; the histo-pathologic processes identical notwithstanding with those observed simultaneously with the presence of parasites are constant, and demonstrate the *Trypanosoma Cruzi* as the indisputable etiologic factor.

In view of the objections of some investigators who estimate in a different manner the clinical aspect of the disease, we insist on establishing at length the existence of changes caused by the attack of the protozoan on the central nervous system. For instance, MacCarrison, in recent works on the etiology of endemic goitre and cretinism, reports the existence in cretins of alterations of motility, and creates on this account a nervous modality for this syndrome of hypothyroidism. We do not wish to contest the interpretations of MacCarrison concerning the nervous phenomena observed in the cretins, the object of his investigations, nor do we doubt the rigor of his observations. However, that which we cannot understand nor admit, is the identification of that nervous cretinism with the cases of diplegia, idiocy, aphasia, etc., from which we constitute the nervous form of the Brazilian trypanosomiasis. As initial argument, and for that matter the decisive one, we should make evident this fact, that many of our observations of displegias as well as of other organic affections of the nervous system, were not realized in individulas with attenuated symptoms of cretinism. Ours are patients who,—presenting many

times hypertrophy of the thyroid, or others conserving the gland with its normal external aspect,—reveal nothing which authorizes the admission in them of a profound functional insufficiency of that organ. In some cases the thyroid gland, with apparent lesions, does not show itself insufficient to the point of constituting the syndrome of hypothyroidism, which will constitute cretinism; and many diplegics without even slight signs of thyroid hypofunction, can be recognized. That which we observe in our patients is the existence of motor alterations combined with histopathologic processes of the nervous centres. Will these processes be determined by the same etiologic factor as cretinism? In the first place, cretinism does not exist here; further, if we have verified in these patients the infection of a parasite which localizes itself in the nervous centres, causing there inflammatory processes easily verifiable, why seek in the indecisiveness of pathogenic hypotheses the interpretation which we find patent in all the autopsies? This is true for the anomalies of motility, especially for the cases of cerebral diplegia which predominate in the nervous forms of the disease. Concerning idiocy we shall be able to present similar arguments. The facts of complete idiocy which we have studied, represent in the majority of cases consequences of the (a) localization of the parasite in the nervous centers, and of the (b) anatomic alterations produced by them. In these patients we do not usually find signs of cretinism, and the glandular function does not present in any wise appreciable insufficiency. This idiocy is purely organic, quite distinct from that which, accompanying the profound signs of hypothyroidism, or rather of athyroidism, deserved from Bourneville the designation of myxedematous cretinism. Simultaneously with the alterations of the intelligence, there are in our patients others on the side of the motility, of the sensation, etc. Our cretins are generally also diplegics, and this co-existence of phenomena, involving motion, sensation, mentality, etc., constitutes the best argument in favor of the organic nature of the idiocy. It is certain that in patients of trypanosomiasis we observe different degrees of mental deficiency with the hypofunction of the thyroid; in this case, however, there exist other signs which proclaim the hypothyroidism and the alterations of the intelligence, which do not reach the intensity which the organic cretinism [156] presents most frequently in this disease. Besides all this, in the cases of simple mental weakness or of intelligence

retarded by hypothyroidism, the absence of the motor anomalies constitutes the precious element of differential diagnosis, making easily recognizable the nature of the mental deficiency.

The eminent Professor Kraus, whom we esteem as one of the most notable modern investigators, also gives a doubtful opinion respecting the existence of nervous forms of trypanosomiasis. The foundations of the indecision of our illustrious friend coincide in their general outlines with those presented in the works of MacCarrison: existence of nervous alterations in cretinism, where not only the intelligence, but also the motility and the sensation and other functions connected with the nervous mechanism, may appear compromised. This is the approximate verification of the works of Scholz on cretinism, which we do not undertake to discuss. Let us examine then our case: localizing itself in the nervous centres, the *Trypanosoma Cruzi* provokes in them in the acute forms of the disease inflammatory reactions which are expressed clinically by signs of meningitis, or rather of acute meningoencephalitis. The autopsies of such patients have amply demonstrated parasitic foci in the nervous substance and also the histopathologic processes caused by them. Identical confirmations have been realized in the chronic forms: in the nervous centres in which the motor alterations predominate, the autopsies reveal foci of parasites and pathologic processes caused by them quite in harmony with the semeiotic signs.

Still, granted a case lacking this evidence, can we suppose that these relations of cause and effect expressed as existing between the action of the trypanosome and the nervous alterations which characterize the respective clinical form, are without basis? In view of our observations regarding the parasite in the nervous centres and the inflammatory processes determined by it, will doubt be possible concerning the etio-pathogeny of the great nervous syndromes which we have indicated in the disease? If this were so, we do not answer for the exact criterion for interpreting the facts in pathology, nor do we know where to find scientific logic. However, we ought to call attention to the fact, that none whatsoever of the aspects under discussion constitute pathogenic anomalies rendered inacceptable by the absence of similar phenomena in other diseases. No; in syphilis we are going to find comparable facts in a great syndrome resulting from the action of the treponema on the nervous centres. Other infectious diseases of acute

evolution can also provoke the inflammatory reactions in the central nervous system with resulting anatomic lesions which express themselves in changes of motility, sensation and intelligence. Besides we shall be able to detect in the majority of cases those morbid processes of the nervous system, acute or chronic, which can be attributed to the pathogenic action of micro-organisms, bacterial or protozoan. How doubt this pathogenic property of *Trypanosoma Cruzi?* How doubt, when this protozoan presents exactly the biologic characteristic essential for realizing part of its vital cycle in the interior (intimidad) of the tissues?

It is fitting that we should delimit the facts and fix well the clinical and pathogenic concept which we possess relative to the nervous forms of American trypanosomiasis. When describing in the disease nervous alterations, in no manner do we involve ourselves in the error of considering such alterations as simple clinical aspects of cretinism. It could not be so even if we did verify the symptoms of that syndrome of hypothyroidism absent in our observations. We recognize as nervous forms those patients with disturbances of motility, intelligence, speech, etc., which imply pathogenic processes in the nervous centres, and the etio-pathogeny of these processes is made evident in distinct autopsies which justify our conclusions completely.

With the clinical history of trypanosomiasis are connected dystrophic states which represent more or less remote consequences of the pathogenic processes of the disease. As the parasite localizes itself in organs of well defined morphogenic function, and acts on organic systems important in the phase of development, it is not strange that there should figure in the clinical picture of this disease very evident dystrophies varying in form according to the nature of the processes which give origin to them.

In units of the endocrine apparatus we report the occurrence of anatomic alterations connected sometimes with the presence of parasites, sometimes with the action of their toxins. In addition to the immediate glandular symptoms resulting from these facts, other late ones exist which show in some manner histo-pathologic or functional residua of the admitted processes.

It is under the aspect of great dystrophies that such symptoms usually present themselves; and this happens owing to the predominant influence of the endocrine apparatus over the trophic equilibrium and the organic development. Of those symptoms, the one

most important and best characterized is that of infantilism which merits a brief report.

Very frequently in the infected zones, this infantilism, which there constitutes a true endemic, presents variable clinical forms in distinct degrees. We observe it in the majority of cases in individuals with other symptoms of trypanosomiasis. How is it to be classified from the etio-pathogenic point of view? Will it be a purely thyroid dystrophy, or will it be pluriglandular? Do we encounter also in the analysis of the pathogenic processes elements which warrant us in placing infantilism in the late symptoms of the disease? The developmental aspect of the infection and the principal localizations of the protozoan establish at once the occasion of dystrophic conditions, among which is infantilism. Initiated in the earliest times of extra-uterine life, the infection produces the organic symptoms in the phase of the life's organization, naturally disturbing it, and that all the more as some among the organs infected exert a preponderant function in the general processes of morphogenesis.

In the etio-pathogenic operation of infantilism there figure processes which are not always of such intense action as that of trypanosomiasis. Syphilis, acquired or hereditary, is an indisputable cause of that syndrome, and according to the best theory, the endocrine alterations constitute a predominant casual factor in luetic infantilism. In the same manner, malaria acquired in the earliest period of existence and persisting through many years leads to a state of infantilism, whose morphology is comparable to that of hypothyroid infantilism. Tuberculosis likewise, as well as other infections of chronic course, acting in the phase of development, may figure in the etio-pathogeny of that syndrome. If this is so, there are abundant reasons for admitting infantilism as a frequent accident in trypanosomiasis, which in its chronic phase—when the parasite is definitely localized in the tissues—acts on the organic metabolism in permanent manner without disturbing reactions during an indeterminate period; and as this condition is allied with the localizations of the protozoan in the glands of internal secretion and in the nervous centres, as the onset of the disease in the first period of life is known, it can cause no surprise, it rather constitutes a fact of evident logic, that infantilism figures among the consqeunces of trypanosomiasis. We are not arguing from a hypothesis: clinical observation comes to confirm this, our

point of view, since it demonstrates the endemic character of infantilism in the zones of triatomas, and since simultaneously with the morphologic syndrome there are observed other symptoms of the disease.

Shall this infantilism be attributed exclusively to the deficiency of the thyroid gland? It is fitting to record to the fact that other organs which play a verified rôle in the morphologic evolution—among these the testicles, and sometimes profoundly.

In this case, is it not preferable to suppose the syndrome to be the resultant of the convergent action of distinct processes, all capable of disturbing the normal evolution of the organism? It will be, then, a pluriglandular infantilism; further, this interpretation seems the most perfectly in accord with the clinical facts in which are observed morphologic types which escape the classification of true thyroid infantilism. Hence the syndrome should figure among the consequences of trypanosomiasis as resulting from the lesions of the endocrine apparatus, even in the mind of those who do not admit that the thyroid gland acts in the pathogenic processes of the disease.

With relation to the etiology of endemic goitre in the regions of Brazil scourged by trypanosomiasis, some investigators take an attitude of doubt. The hypertrophy of the thyroid gland in the zones attacked by the triatoma—is a consequence of the infection, or does it represent a simple simultaneous condition which may be attributed to some other etio-pathogenic factor? It is a debatable question, but that will absolutely not be able to destroy nor to modify in any manner the clinical concept formulated respecting American trypanosomiasis. We insist on this point: the etiology of endemic goitre in the zones of the triatoma can be debated, our opinion according to divergent theories not being admitted, but the clinical history of trypanosomiasis and the concept which we have expressed concerning its distinct symptomatic modalities, that does not admit of the least doubt, because it has been demonstrated by the best elements of experimental proof, of clinical observation, and of anatomic verification.

We are going to report the chief arguments which lead us to constitute of the endemic goitre in Brazil and in the regions of the trypanosomiasis, a consequence of the infection. From the pathogenic point of view the primary argument, which has almost experimental value, is given by the myxedema of the acute cases.

This myxedema announces the attack of the protozoan on the gland and does not constitute an exceptional symptom: on the contrary, it is a constant fact, perhaps attenuated in some patients, but always possible of observation, all of which confirms the pathogenic interpretation which we are undertaking to prove. The myxedema is a pathologic equivalent of the anatomic lesion or of the functional alteration of the thyroid without taking account of the fact that lesion has been demonstrated in autopsies as well as the localization of the parasite which can provoke the lesion. For the same reason, it will be difficult to understand the physio-pathologic phenomena in the acute cases without admitting the specific action of the parasite on the thyroid gland; and if this is so, if in its initial phase the infection attacks in a more or less intense manner the glandular parenchyma, we cannot be surprised by the resulting alterations which betray themselves in sclerosis and distinct degenerative processes, as observed in chronic goitre. It is fitting, therefore, to call attention to the fact that trypanosomiasis constitutes a disease of long duration, acting on the organism in a permanent manner, provoking in the organic systems reactionary processes and variable degenerations, according to the nature of the tissues attacked, nor are the reactions which are produced in other organs differentiated essentially from those of the thyroid. In the liver in the acute phase is observed intense steatosis; when the infection becomes chronic, and after the lapse of some years we arrive at the recognition of the anatomic state of that organ, we observe in it interstitial sclerosis, which betrays precisely the prolonged reaction against a permanent irritating cause. [157] The same reasoning is applicable to the chronic myocarditis, the consequence of acute inflammatory phenomena in the initial phase of the disease, and of a prolonged action of the protozoan on the cardiac muscle. The processes in the central nervous system are also comparable to those already reported. Thus it is a valuable argument which results from the thyroid symptoms in a great majority of the patients of trypanosomiasis. In them on a par with nervous and cardiac symptoms of pathogeny more than evident, we find as a general rule symptoms which announce alterations of the thyroid gland.

The hypertrophy of the organ is observed in almost the totality of the patients, although not infrequently the increase in volume is small, sometimes inappreciable; and in the cases in which the

apparent hypertrophy does not exist, it would still be possible to suspect the existence of alterations of the parenchyma without sufficient exteriorization. All that does not imply that we affirm that the hypertrophy or the lesions of the thyroid are constant elements in the disease; we simply report the great frequency of the affection of the organ without excluding the possibility of clinical cases in which the thyroid may have escaped pathogenic processes.

In the epidemiologic and geographic conditions of endemic goitre and of trypanosomiasis in Brazil, we find new foundations for our conviction. In the regions where we have studied trypanosomiasis, goitre is always observed, constant in persons who live in houses infected by the transmitting triatoma. Up to the present time, there is no exception to this rule; but this fact is still more significant, that those who live in houses free from the infection by the insect do not present hypertrophy of the thyroid nor other symtoms of the disease. Of this we have abundant proofs. We ought to state, that in our investigations all the conditions of life among the inhabitants of housese infected by the hematophage and the inhabitants of houses free from it, were absolutely identical—the same alimentation, the same water, the same general habits of existence. There was only one distinguishing factor in the rooms of the children and adults who presented hypertrophy of the thyroid and other symptoms of the disease—the *Triatoma megistus*. Will it be possible to admit heredity as the exclusive factor in endemic goitre? No. since in persons recently arrived from zones free from goitre, and that even in Europeans, we have observed hypertrophy of the thyroid gland, when they live in habitats of the triatoma. We have identical observations in children, sons of fathers who did not have goitre.

Of great value are the facts which concern the distribution of the disease in the country and in the cities. We have made studies in infected zones, which show that the goitre is relatively rare in populated centres where the better constructed houses do not offer shelter to the insect; also in such conditions of housing, the symptoms of trypanosomiasis are scarce, while in the country where the human dwellings furnish abundant nests for the triatoma, the goitre is very frequent, as are also the clinical symptoms of the disease.

In the points obtained up to the present time concerning the

geographical distribution of the *barbero** and the endemic goitre, we find new elements which speak in favor of the relations of cause and effect, the object of our discussion. The endemic goitre in Brazil does not constitute an anomaly caused by topographic aspects peculiar to the conditions dependent on altitude. It is observed in mountainous regions, in the valleys of great rivers, at slight altitudes, and even in proximity to ocean coasts.

In this particular case, the extreme diffusion of the goitre is worth noting, for its endemicity does not present limited foci, but is observed in vast territories, being more or less intense in distinct zones. With the distribution of the trypanosomiasis and more especially of the triatoma, the same fact is observed. The greatest number of hematophages is found in the regions of the interior of the country, dominating above all in the rural zones: the disease is never observed in determinate foci limited to small regions: on the contrary, in the infected zones it is scattered over vast geographic territories.

In the regions of the interior, where we have observed the existence of endemic goitre, we never fail to find the transmitter, and to confirm in the inhabitants symptoms of infection. It has happened thus in the State of Minas Geraes,‡ where our observations have been most prolonged. On the other hand, in the data obtained in the scientific excursions of the Osvaldo Cruz Institute, is observed the simultaneous existence of the endemic of goitre and of the *Triatoma megistus*. The observations of Arturo Neiva and of Penna in Goyaz, Bahía and Pianhy, and those of Lutz and Machado in Minas and Bahía also attest this.

Ought we to identify with that of Europe the goitre endemic in some zones of Brazil, especially that observed in the regions near to the ocean coasts? Possibly, yes. As for the endemic goitre, which we consider a consequence of the infection by the trypanosome, between this and the European goitre appreciable differences are not to be disregarded, especially from the point of view of their physio-pathological consequences. Undoubtedly similar aspects exist, more largely in the anatomic and histopathologic conditions, which is easily understood, since the same organ would not be able to resist diverse irritating causes by processes essentially distinct. In the physio-pathologic aspects, how-

* In Portuguese, *barbero* (barber), the native name for the infecting bug which bites the face.

‡ All of the states mentioned in this paragraph are in Eastern Brazil.

ever, there exist with absolute evidence differential characteristics as between the European goitre and that endemic in the regions of our country. Thus then, those states of congenital athyroidism which express themselves in the myxedematous idiocy of Bourneville, a pathologic condition in which is observed life-long absence of analogy, in which the intelligence remains initial without any development, and the mucoid infiltration of the subcutaneous tissue reaches the maximum degree, this state which manifests profound insufficiency, or rather absence, of function of the thyroid, and is observed in the goitrogenous (bociogénicas) regions of Europe, never has been observed among us in the vast zones of endemic goitre.

Idiocy is undoubtedly very frequent in the regions infected by trypanosomiasis, but the said idiocy is of organic nature, determined by the localizations of the trypanosome in the central nervous system. The idiots in the said case are, in general, also diplegics, or present monoplegias, announcing the affection of the nervous centres. There is no relation between this idiocy and that determined by the profound functional deficiency of the thyroid, the myxedematous idiocy, whose pathogeny is completely distinct from that which acts in the organic idiocy; for this reason, when we affirm—basing the affirmation on an increased number of clinical observations—the great frequency of the organic idiocy and the rareness of the myxedematous idiocy, we speak of distinct syndromes, and, we believe, not in contradiction to each other.

According to the exhibits of the best observers, cretinism constitutes hereditary hypothyroidism, or may betray a state of acquired thyroid insufficiency. Among us in the zones of endemic goitre and trypanosomiasis, it is not observed with the characteristics described by the European observers. Very few true types of cretinism appear in our works, unless it be permitted to give that designation to simple retardations of intelligence and of physical development, to cretinoid states which can be attributed not only to the hypofunction of the thyroid, but also to the convergence of various factors, and so on: in addition to these we would be able to find other elements which differentiate the goitre in the regions of triatoma from that which constitutes endemia in distinct points of Europe. There is no doubt that this diversity of aspects indicates the lack of identity in the etio-pathogenic factors.

In coming to a close, we wish to insist on the clinical conception acquired regarding American trypanosomiasis, especially in the manner of conceiving the relations between the disease and the endemic goitre. The trypanosomiasis transmitted by the *Triatoma megistus* and related species, is an autonomous disease, of evolution sometimes acute and sometimes chronic, characterized by a symptomatology well determined and well established in histo-pathologic lesions.

The lesions of the thyroid gland are announced in almost constant manner by the myxedema in the acute forms, and in the chronic forms the hypertrophy of that gland constitutes a fact of observations also very frequent.

[158] Is the endemic goitre in the zones infected by trypanosomiasis, a simultaneous condition or an element of the disease according to our concept? Be that as it may, the clinical history of this entity does not depend on the relations discussed, which we consider a problem annexed to the chapter of the trypanosomiasis. Whatever may be the points of view relative to the etio-pathology of the endemic goitre, the clinical and parasitic conception of the disease based on indestructible demonstrations remains unchangeable.

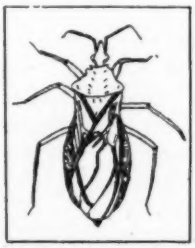
NOTE BY TRANSLATOR.

The illustrations of the original article showed the following:—*Trypanosoma Cruzi* in the peripheral blood; acute case of the disease [a young child]; acute case of the disease [emaciated child]; cardiac syndrome of trypanosomiasis, arhythmia, extrasystoles; parasite in the interior of the cardiac fibre; cardiac form of the disease, interstitial myocarditis [microscopic section]; nervous form of trypanosomiasis, parasites in the cerebrum; nervous form [emaciated negro child]; cerebral diplegia, anthetosis [negro boy]; *Triatoma megistus*, specific transmitter of American trypanosomiasis [reproduced herewith from a pen-and-ink tracing of the original half-tone, no notation given as to scale of picture]; house infected by the transmitting insect [a sort of thatched hut with partly clothed natives in front of it, looked as if it might be infected with almost anything].

Laveran (Trypanosomes et trypanosomiases, 2e éd., Paris, 1912) records the work of Chagas. Speaking of the necessity of knowledge of trypanosomiasis among European physicians, he says in his preface, "Les médecins européens sont donc exposés à trouver,

parmi leurs malades, des sujets atteints de trypanosomiase africaine; il peut leur arriver aussi d'être consultés pour les malades atteints de la trypanosomiase américaine." (In view of the rapidly increasing commercial relations between the United States and South America, the possibility of the introduction of cases of American trypanosomiasis into this country is even greater). For the transmitting agent, Laveran uses the name *Conorhinus megistus* Burmeister, and for the parasite, *Schizotrypanum Cruzi* Chagas 1909. He devotes an entire chapter (pp. 796-812) to American trypanosomiasis. The first announcement of the disease was made in *Arch. f. Schiffs-u. Trop. Hyg.,* xiii, February, 1909, with full details from 1909 on in Mem. do Inst. Osv. Cruz in articles by Chagas and by Vianna. The provinsional name of the parasite was *Trypanosoma Cruzi,* subsequently changed to *Schizotrypanum Cruzi,* but as the result of later studies the earlier name was finally adopted, and is used throughout the article here translated. European experiments with the parasite are noted. Laveran summarizes the evolution and symptoms in man and sensitive animals from a memoir by Chagas. The studies on the pathologic anatomy by Vianna were still in progress when Laveran published his second edition (1912), as were also studies of the life-cycle of the parasite; and for this reason Laveran reserves judgment on various interpretations made by the Brazilians.

Under the heading of treatment, Laveran says, "Nous n'avons trouvé, dans les mémoires publiés jusqu'ici, aucun renseignement sur le traitement de la maladie humaine dont le pronostic ets trés grave." Manson (6th ed., 1917, p. 192) says, "We know no specific remedy. Arsenicals and antimony have failed in experimental animals. Treatment, therefore, must be on general lines."



Triatoma megistus, specific transmitter of American trypanosomiasis.

Chagas in the present article refers to the insect transmitter as *Triatoma megistus.* Castellani and Chambers (2d ed., 1912) call it *Lamus megistus* Burmeister (synonym *Conorhinus megistus* Burmeister) in the entomological section of their Manual of Tropical Medicine, and do not describe *Triatoma* of any species. But in the medical part of the work (p. 986) they state, More recently Chagas has shown . . . . . that *Triatoma geniculata* (synonym *Conor-*

dinus geniculatus) of the family Reduviidae is one of the carriers of the same trypanosome. He also believes that *Triatoma infestans* and T. *sordida* may be carriers."

An editorial, "Brazilian Trypanosomiasis—Chagas' Disease," in the *Journal of the American Medical Association,* February 17, 1917, uses the older names, *Schizotrypanum Cruzi* for the parasite, and *Conorhinus megistus* for the insect. The latest article by Chagas cited was one published in 1911.

Manson (6th ed., p. 188), naming the bug *Lamus megistus,* comments in parentheses, "at first erroneously supposed to belong to the genus *Conorhinus,*" and devotes to it a colored plate "after Chagas," which shows its striking red and black markings. In its general form it closely resembles the engraving in black and white given by Castellani and Chalmers, and also the tracing from Chagas' article here reproduced.

SPEECH DISORDERS AND CORRECTIVE WORK.*

By MISS S. SPYKER, New Orleans.

The systematic evolution of speech is a long process, and not an inheritance transmitted from parent to child in perfected completeness.

Heralded by the first wail of the infant at birth, we may trace its development, step by step, from inarticulate simplicity to articulate complexity; but the process is so slow and its fulfillment an experience so common that we do not reflect upon its wonder until we are confronted by some irregularity which deprives the sufferer of the conventional mode of expression.

It has been said that pantomine is the herald of thought, and the word its label. In this connection it may be stated that although the written or spoken word is the most precise, and the most highly polished mode of expression, that individual who voluntarily conveys his thought or feeling by pantomine action, by the manual alphabet, by the cry of pain or shout of joy, cannot be said to be altogether devoid of the speech function. Nor does the term "speech" necessarily imply social intercourse, requiring the presence of more than one person; yet such is the popular conception of the subject. The absorbed thinker frequently, usual-

* Read before the Orleans Parish Medical Society, February 23, 1920. (Received for publication April 12, 1920.—Eds.)

ly, pursues his train of thought by means of unspoken works, and in this sense it is quite possible to employ the process in silence and in solitude; but the discussion of the faculty of speech is a subject for the academician; not for the teacher. I shall ask your attention for a few moments to the disorders of speech found among, and the corrective work accomplished with some of my pupils.

Case No. 1. This case was reported several years ago in the February number of the Volta Review, and reproduced here because of its uniqueness.

The case was that of a young woman 18 years of age, who had considered herself a "deaf-mute," and had been so considered by others all her life.

The history of this case is vague; the girl came into this community as a stranger earning an insufficient livlihood by selling sundry articles to business houses on commission. Writing and the manual alphabet were the media of communication. She had learned to read and write at a school for the deaf. It is understood that she had heard no speech spoken during the developmental speech period; and it is believed that although possessed of a certain degree of hearing power, this power had been lost through disuse, through a lack of the exercise of the function of hearing. The child of deaf-mute parents, and reared with deaf-mute companions, her environment had offered no incentive for acquiring articulate speech.

She had made good use of such limited instruction as had been vouchsafed her. Books gave her pleasure, and she wrote fluently—not always grammatically. Her vocabulary measured by her opportunities was large and her use of words accurate. Her finger spelling was glib.

No lack of integrity in intellectual processes was disclosed by the neurologist's examination, and the aurist's examination attested a fair remnant of hearing power. Although unable to communicate with others by means of vocal utterance, her attainments in reading, writing, finger spelling—in a word, her ability to convey her own thoughts to, or to interpret the thoughts of others proved that she held within herself the potentiality of speech. Its actualization in so limited a period would otherwise have been impossible. On Monday, April 3, she presented herself for instruction—a so-called "deaf-mute," with all the disadvantages ac-

companying this condition. By various tests made with the speaking voice in close proximity to the ear, it was discovered that she was capable at that time of hearing and uttering all the simple sounds of the language; but because the discovery was startling it was withheld during the first week of her instruction. The ear which had failed to listen to speech and the vocal organs which had failed to utter speech during 18 years, were untrained for the task imposed, and as a consequence the perceptive and executive performances were most imperfect and also highly discouraging. Let it not be inferred that during one week she had acquired a colloquial use of speech; far from it. She had acquired more or less imperfectly all the simple sounds of speech, some of their combinations and a few words.

At the expiration of the first week the discovery made during the first interview was declared to her in writing; "You can talk now; go home and do it." She returned the Monday following with a report from her room-mate of having talked in her sleep all night. It is understood that the words were simple ones and not grouped into sentences. So much was gained by suggestion! It was found that such success as might be attained through this instruction would depend upon awakening her latent hearing power and appealing to what she heard, not to what she saw; for her entire attention hitherto had been directed to fingers rather than to faces, but no foundation for the speech—reading habit had been formed, but the transfer of visual attention from hand to countenance was affected during a few weeks.

The first lessons were conducted in front of a mirror placed so that she could see both her own face and the face of the instructor. Her hand was held on the instructor's larynx and the sound or word used for practice at the moment was spoken distinctly and repeatedly in close approximation to her ear. She then attempted to reproduce the sound as she perceived it through the senses of hearing, sight, and touch. In every instance she acquitted herself of the task, but as has been already hinted, with more or less inaccuracy. At the beginning of the second week the aurist in the case advised the use of an instrument which enabled her to hear quite well, and her subjective hearing now began to improve quite rapidly; objectively it was as though she heard not. Reared as alien to the speaking community, and deafness and mutism the impress of her earliest and growing consciousness opportunity had

been wanting for the development of the auditory associational process.

Visual word memories had been already established; the kinaesthetic memories were quickly acquired—at the end of the second week she had learned to say her name, where she lived, when she was born, the days of the week, the months of the year, and one apparently spontaneous sentence; "I have a new skirt, do you think it is pretty?"

But the development of auditory word memories was a painfully slow, laborious process, and was accomplished only by visualizing the word or sentence at the same time that the instructor repeated it again and again, day after day. The average child listens to speech long before he makes use of it; the young woman in question reversed this order of procedure and made use of it before listening to it.

The instruction covered a period of 3 months. The early days of April recorded her a "deaf-mute" without voice or articulation, and communicating by means of the manual alphabet and writing. The latter days of June witnessed the development of sufficient volume of voice to be heard through closed doors from one room into another, and the transition from the sign language and writing to the spoken word.

Case No. 2. This was a case of acquired deafness. At three years of age the child was striken with deafness caused by spinal meningitis. Equipped with the vocabulary of three years of age no loss of speech was ever permitted by his watchful parents. The child was spoken to constantly and urged to return the compliment; so the instructor's task was comparatively an easy one.

The boy is now fifteen years of age. He has acquired the English language, in which he reads, writes, and speaks. He also speaks French but does not read or write the language. The ability to do this presupposes, of course, the ability to read the lips of others. He is attending a school for hearing children, and I understand, keeping up with his class. Two years ago he became qualified as a boy scout and won a prize competing with normal boys for selling bonds in one of the "Victory" or "Liberty" loans.

Case No. 3. This case is cited as representative of a number of pupils who have presented themselves for instruction. The pupil under discussion was a young boy of twelve years of age, pleasing appearance and manner, with no structural irregularity

in the peripheral mechanism of speech. He was left-handed and the difference in the size of the two hands was quite marked, but this slight abnormality excepted, he manifested no peculiarity other than his speech defect. This latter was so conspicuous as to afford his scarcely an approximate means of communication with others.

Despite the fact that his language bore little resemblance to that spoken about him, indeed was unintelligible save to the few most intimately connected with him, he had attended school regularly and not only kept up with his class, but had held an honoured place.

The flushing cheek and gathering tear, however, attested his discomfiture when failing to make himself understood; and subsequent training revealed conclusively that his speech defect was having a most humiliating influence upon him.

Great complications of combined muscular movements arise during the processes of speech, and a study of these movements while talking proved the boy's inability to make any but the simplest combiations of the language. The articulatory mechanism having been inadequately trained to meet the needs of his developing intellect he found himself in the painful position of taxing it with the most impossible performances whenever he attempted to speak. Moreover this faulty articulation was making a deeper impress with every day of its continuance, and standardized modes of speech were becoming more and more unattainable.

Feeling the need of expert guidance in the case I sought the diagnosis of a skilled neurologist. Submitted to the Binet-Simon scale for measuring intelligence, the boy's mental age closely approximated his physical age; but the physician discovered that a slight injury to the brain, involving the speech centres, had been experienced probably at birth, and certain portions of the articlulatory mechanism had failed to come under the control of the brain during the formative speech period, hence both its retarded development and eccentric character.

The task set for us was that of training or re-educating the speech faculty, and it was not a simple one; for the disturbance was central as well as peripheral. The boy could locate sounds readily and he could read and write from dictation; but he had a peculiar mental freak of hearing; akin to word deafness, but differing from it, in that he was deaf only to certain sounds of

his own speech, whereas these same sounds when produced by others he heard accurately and well, as already stated. Moreover he had grown so inured to his own speech that he could not distinguish the correct from the incorrect form. For instance he satisfied himself when he said "fanety-fane" for seventy-seven, or "Funday" for Sunday, and "Fink-Vou" for think thou. He was by no means keenly critical of the speech of others; but he was acutely conscious when any one else said "fanety-fane" or "Fundy" that he was the object of ridicule.

Studying his speech with untiring care, I found the disturbance arising from two causes. The primary and more potent cause was directly traceable to the injured brain diagnosed by the physician and manifested in the pathological language already referred to.

The secondary and minor cause of the trouble was the result of dialectal models of speech copied by the child during the developmental speech period. The latter was not inherent in his own organism as was the more potent, primary disturbance, but was directly traceable to his environment. Certain of his utterances were characterized by such glaring deviations from the accepted and standardized modes of speech that the nomenclature was easily made. For instance: "Fundy", "Fanety-fane" could be classified as "pathological language". The failure to pronounce final "r" in door, floor, etc., and final "g" in morning, building, was clearly the result of environment and could be called "provincial". But so subtly combined were the pernicious influences bearing upon his speech that in the greater number of instances it was impossible to separate the several impurities found in a single sentence and to say, such is pathologic, such provincial, or diacetal utterance.

The vowel sounds and coalescents with their fine shadings offered greater difficulty than that of the consonants.

This boy was under my care for eight or nine months and splendid results were obtained. He was taught the physiology of the alphabet of sounds recognized as the standard of the language and a failure on his part to meet the requirements of this standard was indicated to him and he was incited to surmount the difficulty.

This corrective work necessitated training both the eye and the ear. In visualizing a word he seldom made a mistake in its

consonantal elements after the 2nd. month of training. He was not so happy in the acquisition of the vowels, diphthongs and coalescents which offered greater elements of difficulty. This case was one of deepest interest, for while much depended upon the patience, tact and skill of the instructor, more depended upon the ambition, the determination, the sustained endeavor of the pupil—in a word upon his inherent physic necessity, his necessity for communion with his fellows.

Case No. 4. A Cleft Palate.

The speech of the Cleft Palate pupil is defective in two important particulars, namely, resonance, and articulation.

If the closure of the cleft has been effected and the speech training begun in early life the prognosis for normal spech development is good. A child is under my care, now, for whom I think it safe to predicate this result. The operation was performed when she was quite an infant and followed at four years of age by systematic speech training.

When standing guard over her speech as in reading, and reciting poetry, she now has really beautiful tones of voice; and her articulation is distinct and graceful. When at play, however, she falls into very rapid utterance and at times even nasality of tone.

The child of wealthy parents, no expense is being spared and we hope to train her ear to exact, and her articulatory mechanism to render the most highly polished utterance at all times.

When the closure of the cleft is not affected until adolescent or adult life, the speech of the pupil may be greatly improved, but I have never seen a case where it had been brought up to normal; for it must be remembered that the pupil has been trying all his life to accommodate himself to faulty structural conditions, to the absence of the normal palate; and that, in his effort to do this, he has substituted, for purposes of speech, other organs lower down in the throat and in this process of substitution faulty musculatures have been developed, including a faulty development of the nerve centres supplying them.

Two children, one fourteen and one eighteen years of age, are under my care now. The younger has recently undergone a successful operation, but she is partially deaf, and the work of speech improvement is fraught with much difficulty. A plate has been prescribed by the physician for the older sister, an operation not having been deemed advisable. Both are improving and both are

being taught, as far as possible, to recognize normal speech and to make the best use of their still imperfect organs in its production.

I cannot close this very informal report without a word in regard to stammering, which is a disorder of speech due to a lack of promptness in the action of one or more of the cerebral speech mechanisms, and is characterized by hesitation, and varying degrees of spasmodic muscular actions and bodily contortions.

I have taught a great many stammerers and have been successful as well as unsuccessful. Two cases stand out rather prominently, one a young man who was practically relieved in two weeks, but who remained under my care for some time longer; as he expressed it to make sure of himself. This case was a simple one: our task was merely that of re-educating the speech faculty.

The other case was that of a pupil in my class at the hospital. She was under instruction but a short time, and I know nothing of her subsequent history; but she was relieved in a few lessons. Finding her to be a lefthanded subject, who had been forced to write with the right hand, and who had developed stammering about the period of entrance into school, I made the experiment of educating the left hand, and having all her work accomplished in this way. As I say it was an experiment, but it worked admirably for she ceased to stammer almost immediately. I have since lost trace of her, and do not know whether the habit has reasserted itself. Where stammering is a part of the individual himself it is very difficult to overcome. A child of three and a half years may be relieved in a short time; whereas a man of fifty would find the same process very difficult.

THE DIFFICULTIES OF SPEECH IN ACQUIRED DEAFNESS.*

By MISS SUE B. POWERS, New Orleans.

What does speech tell you? Listen to not the words but the voice and speech of a group of strangers, or the chance acquaintance. One can easily detect the characteristics of timidity, patience, self-possession, self-pity, extremely nervous, and that nasal dissatisfied quarrelsome drawl. These we know. There are other

* Read before the Orleans Parish Medical Society, February 23, 1920. (Received for publication April 12, 1920.—Eds.)

real defects of speech, as the lisper and stutterer. Again is noticed that sometimes peculiar deaf voice and speech. It is that too rapid or too slow nonmodulated speed with the poor letter blending, the final *s* and final syllable missing that we hear in the speech of many deaf people.

These difficulties of speech in acquired deafness are very often acquired with the coming of the deafness.

Here is where the trouble lies. Either the person had poor speech before deafness or because of the highly nervous condition since becoming deaf, and not hearing his own speech he is not aware of the mistakes.

The matter of retaining or of gaining good speech is of great importance. After having looked closely into the family, personal, physical, home, medical and social history, one is ready to begin work in the actual speech conditions.

The degree of poor or good speech will depend to some measure upon the age, degree of education, remnant of hearing, total deafness and mentality.

If the acquired deafness has occurred during the speech developmental period, the training must be more elementary. Then too, where a great sense of vibration, and the memory of voice sounds exist, one finds a help.

Another point to be determined is whether he has brought over any pre-deaf speech trouble. Suppose he has not. In the acquired deafness, we always find the nervous person. In these I find either the hoarse voice, low or whispered tones, the high-thin voice, the very deep loud voice or the indistinct speech.

Often the difficulty is mechanical, because of the lack of back and front oral activity. The tongue may be large and stiff, or too relaxed, the nasal passages closed, the arch of mouth high and narrow, the teeth poor, the lip movement bad and the lower jaw relaxed.

The trouble may be merely the negligent type of speech difficulty. Sometimes because he always had such, then again because he does not hear his own voice which may cause lack of inflection and emphasis. I have found the letter substitution as he may have previously done or as he sees it on the lips. Also the blend sounds, the final letters, and correct syllable division gives trouble.

With the child under ten and twelve the difficulty is often all

three types of speech, but with the adult most often only the neurotic speech.

With the neurotic speech I work for voice control. With the mechanical after the several specialists have done their work, the tongue and facial gymnastics, drills on letter positions, correct division into syllables and much speech is very beneficial. In the negligent speech the same letter positions, blend sounds, old memory work of simple rhymes, simple story telling, oral reading and much conversational work. The latter transfers the interest from self to more of the normal person.

As these deaf people are not at all unlike those having hearing but defective speech, we must always take into consideration the highly keyed nervous state in which they live. They hear with every square inch of their skin and bone.

Hence some physical activity must be arranged as the swimming, walking, rhythmic games and dances. Anything that brings into action the coarse muscle co-ordination will relieve the nervous pressure thus helping in that fine co-ordination which speech required.

In many cases of acquired deafness, the sense of equilibrium is destroyed, so the inability to swim head under, to walk straight and to not drag the heels has some effect on speech.

In acquired deafness not only must the lip reading be given but the difficulties of speech and voice must be watched as well.

One may work ever so hard to correct a fault and then not succeed, the chief reason for which rests on the back-ground information; by that I mean the complete history. To just the degree to which the medical history, the home history, the neurologist's report, the ear, eye, nose and throat specialists' reports, and the dental report, added to the psychological examination, will all the combined efforts work for that successful training these cases of acquired deafness should have.

Another thing needed is a greater knowledge on the part of the public that such work can be done and that there is real value to the one making the effort to have it.

How has it been done in some places? By those that have been helped continuing to help one another, by the knowledge on the part of the public of the work, by compulsory school laws, by the compulsory reporting to educational officers all the types of defects and then by the organizing of more day schools not in just

one city in the state but several centres can the training be given.

Like everything else in the whole world there must be co-operation on the part of those who understand with those who as yet do not.

How about the co-operation of the medical profession with the teaching profession for some of this corrective speech work? With united efforts prevent the speech defectives by taking care of the defective speech, and change the unhappy deaf to interested life-readers, thereby adding many useful men and women to society in the place of the useless self-pitied unhappy burden on society.

I have with me tonight two cases of acquired deafness, Irene aged 15, who was made totally deaf from spinal meningitis at the age of seven. She had attended school one year before becoming deaf. Irene entered the New Orleans School for the Deaf when nine years old. By that time she had lost all voice control and was not increasing her vocabulary for she was deaf and could not read the lips. She lived in a highly neurotic speech-atmosphere. During the five years and a half in the deaf class she has reached the fifth A. Grade, changed the speech from the rapid, neurotic high, uncontrolled speech to the conversational tone, acquired the ability to read lips and to converse with anyone with whom she is thrown.

She is a normal girl enjoying school, dances, and picture shows, mingles equally through the younger child and the older person. She was given this opportunity through the foresight of the specialist who knew the value of lip-reading and speech to the acquired deaf, and at the time of her deafness insisted upon the child's parents seeing that she had no other kind of instruction.

The other case, a returned soldier, now under training of the Vocational Board of this District, is Mr. Lee, 21 years old, and is 100 per cent deaf in one ear and 60 per cent deaf in the other. While with the Coast Artillery in France from exposure he had pneumonia, then measles and mumps. This left him with only a remnant of hearing. He is making use constantly of this remnant of hearing, thereby strengthening the auditorial center and correcting the neurotic-speech hesitancy that came with the deafness. He has not completed his lip-reading work, but is making more than the useual progress.

In this same work with the deafened soldiers another case of combined interest is a 22 year old boy whose hearing is minus in one ear and 50 per cent minus in the other. He had for a long

time middle-ear trouble before going into the service. With the deafness was the combined-speech trouble. Certain consonants and blend-sounds he seemed never to use in natural speech. These were worked over along with the lip-reading. In the two months he improved greatly in speech and acquired ability to read the lips rapidly. He is now taking a course in Mechanical Engineering under the Vocational Board.

Among the cases reported to me since I have been connected with the City Public Schools, is a boy. Charles was transferred from the Grammar School to the deaf class because he was too deaf to understand. His medical history gave a running ear during the first year of infancy, whooping cough at seven months, scarlatina at four years, adenoids removed at seven, radical mastoid operation at eight, ears operated again during the eighth year, measles at twelve. His social history shows that he does not enjoy play with other boys, probably because of lack of hearing. School history shows that he finished Grammar School at thirteen, and is now at fourteen and a half doing the second year High School Commercial course. By the close co-operation of the principal and departmental teachers of the Grammar School, Charles, with teachers of the deaf, he, in place of dropping out of school and being unprepared, is making preparation for useful citizenship. His speech-type is nasal, caused by a back oral inactivity, and a slightly relaxed jaw.

In the case of acquired deafness I have found that those caused by meningitis require the greatest care. Either the speech is neurotic and the voice low and deep, or high and non-volume in tone. The lip-reading work of these is not as satisfactory as of those gradually acquiring deafness. The difficulties of speech are very similar.

NEWS AND COMMENT

National Anesthesia Research Society.—At a meeting of the Board of Governors of this Society held in Cleveland in March, it was voted to have the annual convention of the Society at Pittsburgh the week of October 4, the meeting to be in conjunction with that of the Inter-state Anesthetists Association, and the Pennsylvania Medical Society. There is also a possibility that the Western Pennsylvania Dental Association will join in the meeting. The Governors voted $200 to be appropriated in prizes for the best papers on research in anesthesia, such papers to be read at the national meeting. The offer is open to all students, surgical, medical, and dental practitioners in the United States. A committee of three consisting of Drs. A. F. Erdman of Brooklyn, A. H. Miller of Providence and E. I. McKesson of Toledo was appointed to prepare a uniform anesthesia chart for use of hospitals.

Disabled Ex-Service Men now in Public Health Service Hospitals, or in certain private hospitals and sanitoriums, are receiving training for gainful occupations in vocational schools arranged by the Federal Board for Vocational Education. All work is being done under medical supervision and no work undertaken without approval of the medical officer in charge. Vocational schools are already started in P. H. S. hospitals at Perryville, Md., and Greenville, S. C., and in private sanatoriums at Saranac Lake, N. Y., Ruthland, Mass., El Paso, Texas, and Sanatorium, N. C. Work will soon be under way at P. H. S. hospitals at East Norfolk, Mass., New Haven, Conn., Alexandria, La., and Biltmore, N. C. General Horace H. Wood, director general of Soldiers' Homes, has offered the Federal Board space in all homes, and the home at Johnson City, Tenn., will have the first training class under this new management.

The United States Department of Labor announces the establishment of a national children's bureau in Belgium. The law establishing this bureau went into effect several months after the child welfare conference held under the auspices of our own Children's Bureau in the early summer of 1919. Three child welfare experts represented Belgium at that time. Their idea is to encourage and develop the protection of childhood, and especially to further education with regard to rules of child hygiene; to pro-

mote the organization of agencies interested in child hygiene, and to assist them by subsidies or otherwise; to assure supervision by the administrative authorities and physicians over the agencies thus protected.

PROF. F. DELAPERSONNE, assisted by Prof. Agrégé Terrien and Drs. Velter Prelat and Mombrun, Chief of Clinical Laboratory, of the Faculty of Medicine of Paris will on May 11, 1920, inaugurate a finishing course in ophthalmology, with clinical examinations, practical medicine and operative surgery and laboratory technique. The work will be conducted during May and June, and a special certificate of attendance will be issued on completing the course. Those desiring to follow the course should address the secretary of the Faculty of Medicine. The number will be limited to 40 and the fee will be 100 francs.

TYPHUS CURBED IN RUSSIA; SPREADS FAST IN SERBIA.—Announcement is made that the mortality from typhus fever has been reduced in Russia from 47 per cent to 6 per cent by the use of a new serum adopted by the Red Cross workers at Ekaterinodar, in the Kuban district of Russia. Confidence is expressed that the serum may save Russia from decimation by typhus. The disease has however again made its appearance in Serbia and is being spread with alarming rapidity by refugees fleeing from the bolsheviki on the south Russian Front. American Red Cross officers at the request of the government are preparing to disinfect every person entering the country.

THE UNITED STATES CIVIL SERVICE COMMISSION ANNOUNCES THE FOLLOWING competitive examinations:—Physician, Panama Canal Service, May 5 and July 7, 1920. Medical Interne, St. Elizabeth's Hospital, July 1, 1920. Junior Zoologist, May 19, 1920. Applicants must have graduated from college, university, reputable medical college or veterinary college of recognized standing as the case may be. Both men and women may enter the examinations for physician and medical interne. Applicants must submit with their application a photograph taken within two years of date of application. They should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C., the Secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York City, New Orleans, Honolulu, Hawaii, Post Office, Philadelphia, Pa.,

Atlanta, Ga., Cincinnati, Ohio, Chicago, Ill., St. Paul, Minn., Seattle, Washington, San Francisco, Calif., Old Customhouse, St. Louis, Mo., Administration Building, Balboa Heights, Canal Zone; or to the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

ASSOCIATION OF PHYSICIANS OF THE FRENCH LANGUAGE TO MEET.—The fourteenth French Congress of Medicine will be held in Brussels, Belgium May 19-22, 1920. The following subjects will be taken up and discussed: Syphilis of the Cardio-Vascular Apparatus; The Lipoids in Pathology and The Therapeutic Value of Artificial Pneumo-thorax.

RED CROSS COSTUME THE MODE IN THE BALKANS.—The American Red Cross uniform threatens to become the *dernier cri* in Albania and other Balkan countries where the organization is carrying on relief operations. Grateful children whom the Red Cross has fed and clothed insist that the costume of their benefactors must be the dress of Armenia, and they are eager to adopt it. In Scutari, Albania, hundreds of American sewing machines are humming to provide clothes for needy refugee families and labor for women who must have employment. Sewing classes have been opened in all the large Albanian towns, where hundreds of young girls are being taught plain sewing. Invariably their first attempt at designing clothes for themselves is a copy of the uniform worn by their Red Cross teacher.

THE SOCIETY FOR VISUAL EDUCATION was recently incorporated by a group of educators mostly prominent in university circles; the stated purpose of the society being for the promotion of visual education. It is not proposed to do away with text-books, models, maps or other educational apparatus, but on the contrary to supplement them and make them more available. The society also proposes to publish a monthly periodical called *Visual Education*, and has already issued the first number. In addition to the officers, Rollin D. Sailsbury, University of Chicago, president; F. R. Moulton, University of Chicago, secretary, and H. L. Clark, Utilities Development Corporation, vice-president, the personnel includes a board of directors which represents most of universities, a large general advisory board and special committees in all the various sciences and educational departments. The address of the organization is 327 South La Salle St., Chicago.

FIRE WOOD BY WIRE CABLE.—A steel cable stretched across an unbridged chasm in Montenegro is serving as a means of transportation for fire wood brought from neighboring mountains to the coal-less population of Podgoritza. An American Red Cross officer devised this cheme, which enables the people to utilize the great quantities of fire wood all dried and ready for burning left in the mountains by the Austrians in their hasty retreat a year ago. Destruction of all the bridges by the enemy made this fuel inaccessible to the pople of the shivering town.

THE VISITING NURSE SERVICE of New York City is conducting a city-wide campaign to raise an amount of $1,000,000, part of which will be used to establish day and night maternity centers. The center now established at 234 East Seventy-second Street is taxed to its limit.

CHILD RELIEF WORK IN HUNGARY.—Since August, 1919, American child relief workers in Hungary have distributed the following articles: 170 tons of sugar, 414 tons of milk, 290 tons of peas, 146 tons of fats, 37 tons of soap and 613 tons of flour. 105,000 children are being give one meal daily by this American relief organization.

DECORATION FOR SMITH COLLEGE RELIEF UNIT.—For work among the civil population in the retreat from Montdidier, the French Government has bestowed on the Smith College Relief Unit the silver medal of "Reconnaissance Francaise."

RED CROSS RECEIVES DONATION FROM JAPANESE.—A fund has been established by the Empress of Japan, the income of which will be used to promote public health and preventive medicine, under the direction of the International Committee of Geneva. It is intended to use the fund for the following purposes: 1, for work which the International Committee of Geneva consider advantageous for the general interest in their peace-time program; 2, to increase the popularity of the methods adopted by the Red Cross Societies and recognized by the best authorities for the prevention of or extirpation of tuberculosis and other malignant contagious diseases; 3, to aid the rescue work of the Red Cross Societies for victims of great disasters. Red Cross Societies desiring to obtain grants of funds should apply to the International Committee at Geneva.

At a Recent Meeting of the Board of Trustees, University of Alabama it was ordered by a vote of eight to two to remove the University medical school from Mobile, Ala., to the university site Tuscaloosa, Ala. The new ruling becomes effective at the end of the present session. **(Daily Press.)**

In His Annual Report, Dean H. H. Rusby of the College of Pharmacy of Columbia University emphasized Pharmacy as a field for women. With the increased popularity of pharmacy as a profession for women, there is a corresponding increase in the number of women who are preparing themselves to take up this line of work. In commenting upon the large increase of women in attendance during the past year Dean Rusby says that they have won their full share of class honors.

Ordinance for Venereal Clinic.—On March 2, the city council of Peoria, Ill., passed an ordinance for the establishment of a municipal clinic for the treatment and isolation of venereal diseases. The ordinance provides for a commissioner of the dispensary with a salary of $3,000 a year and authority to declare quarantine if certain phases of the ordinance are not observed.

Meeting of American Urological Association.—The seventeenth annual meeting of this association was held at the Hotel Commodore, New York City, March 23-25, under the presidency of Dr. Arthur L. Chute, Boston. Officers elected for the ensuing year were as follows: President, Dr. W. F. Braasch, Rochester, Minn.; vice-president, Dr. H. G. Bugbee, New York City; secretary, Dr. Henry L. Sanford, Cleveland, Ohio, re-elected; treasurer, Dr. James A. Gardner, Buffalo, re-elected. Montreal, Canada was chosen as the next meeting place.

Fees Raised in Chicago.—A new scale of fees amonuting to fifty per cent increase was adopted at a recent meeting of the council of the Chicago Medical Society. Some of the new fees adopted are as follows: House visits, former maximum $5, now $15; night visits, formerly $3 to $10, now $10 to $50; operations involving fractured ribs, formerly $25 to $50, now $50 to $500; toe amputations, formerly $15 to $50, now $50 to $200; major operations will range from $200 to $10,000. The scale will be flexible, and will be governed by the patients' ability to pay.

THE BAPTIST MEMORIAL SANATORIUM is working out plans to make Dallas, Texas, the medical center of the southwest by the building and equipment of a hospital and medical college to be the equal of any of the larger institutions of the country. Funds are being raised for the purpose. The Baptist Memorial Sanatorium, Baylor Colleges of Medicine, Dentistry and Pharmacy, and the Baptist Training School for Nurses will be used as the basis to elaborate and form such a medical center.

TO BUILD NEW WOMAN'S HOSPITAL.—It was decided at a meeting of the board of directors of the New Orleans Woman's Hospital to begin a campaign to raise funds for a new hospital. Reports showed a waiting list of women desiring admittance from all over the state, scores of applicants being disappointed owing to present inadequacies. During the month of March 749 cases were treated, 386 old and 363 new cases. 316 prescriptions were filled.

PERSONALS.—Among the Louisiana doctors who have returned from service in this country and abroad are the following: A. S. J. Hyde, Baton Rouge; H. L. Ballowe, Buras; R. S. Kemp, New Orleans.

REMOVALS.—Dr. W. B. Singletary, from Wilson, La., to Baton Rouge, La.

DIED.—On April 1, at San Francisco, Cal., Dr. William Martin, aged 71 years; medical inspector of the United States Navy, retired, and noted for his work in combating yellow fever in Florida and Louisiana.

BOOK REVIEWS AND NOTICES

All new publications sent to the JOURNAL *will be appreciated and will invariably be promptly acknowledged under the heading of "Publications Received." While it will be the aim of the* JOURNAL *to review as many of the works accepted as possible, the editors will be guided by the space available and the merit of respective publications. The acceptance of a book implies no obligation to review.*

Geriatrics, by Malford W. Thewliss, M. D. C. V. Mosby Co., St. Louis.

Among the philosophies of conserving the longevity of human life, not a few have ventured the exceptional theories, notably Metchnikoff. Now comes a systematic study of old age from the physical, psychological and practical sides. The essay is worth while and is recommended to all physicians who have the humanity interest in old age. The author concludes his book in proposing particular treatment for the ills which overtake the aged. DYER.

Pellagra, by H. F. Harris, M. D. McMillan Company, New York.

The author has brought together a large amount of material from many sources, covering all phases of pellagra. While a zeist himself, the author presents the various theories until now advanced to explain the origin of pellagra. It is interesting to note the importance the author attaches to the work of the Strambios in the late eighteenth and early nineteenth centuries, a proper tribute when it may be stated that no one has since so clearly presented the clinical entity of pellagra as these early writers.

Dr. Harris has overlooked the rather interesting observation of Strambio (G.) on the relation of pellagra to the scarcity of fuel in the Piedmont, during the severe winters of his time. Thru this, the people lived in the stables among the cattle, because of the incidental warmth of the animals. To the association with the cattle is attributed a possible occasion of pellagra.

Dr. Harris' contribution to pellagra is wholly creditable and should be widely read. It is interesting to note that this is the fourth extensive work on pellagra to appear from the pens of Southern writers (five if we include the translation of Marie). The review of the arguments of the author with the analysis of the views of other theorists still leaves the cause of pellagra an open problem.

DYER.

Electricity in Medicine, by George W. Jacobs, M. D. and Ralph Jacobs, A. B., M. D. P. Blakiston's Son & Co., Philadelphia.

This valuable work is comprehensive covering the study of the pure physics of electricity, its technical methods and its application to conditions of a medical nature to which this physical remedy best applies. It is a work too important to be overlooked by the physician engaged in such practice and too valuable to be missed by the man who wishes practical knowledge well presented. DYER.

PUBLICATIONS RECEIVED

W. B. SAUNDERS COMPANY, Philadelphia and London, 1920.

Physical Diagnosis, by John C. DaCosta, Jr., M. D., 4th edition.

Orthopedic and Reconstruction Surgery, by Fred H. Albee, A. B., M. D., Sc. D., F. A. C. S.

Diseases of Infants and Children, by J. P. Crozer Griffith, M. D., Ph. D., Volumes 1 and 2.

The Medical Clinics of North America, Vol. 3, No. 4, January, 1920.

Surgical Clinics of Chicago, Vol. 4, No. 1, February, 1920.

THE MACMILLAN COMPANY, New York, 1920.

Common Diseases of the Skin, by G. Gordon Campbell, B. Sc., M. D., C. M.

The Treatment of Syphilis, by H. Sheridan Baketel, A. M., M. D.

WILLIAM WOOD & COMPANY, New York, 1920.

Manual of Surgery, by Albert Carless, C. B. E., M. B., M. S., Lond., F. R. C. S., 10th edition.

Manual of Practical Anatomy, by Arthur Robinson, Prof. of Anatomy, University of Edinburg, 7th edition.

F. A. DAVIS COMPANY, Philadelphia, 1919.

A Laboratory Manual of Physiological Chemistry, by Elbert W. Rockwood, M. D., Ph. D., 4th edition revised and enlarged.

Laboratory Manual of Pharmacology, by A. D. Bush, B. Sc., M. D.

WASHINGTON GOVERNMENT PRINTING OFFICE, Washington, D. C., 1920.

Special Tables of Mortality from Influenza and Pneumonia in Indiana, Kansas and Philadelphia, Pa., September to December 31, 1918.

Mortality Statistics 1918, Bulletin 141.

U. S. Department of Agriculture, Service and Regulatory Announcements Supplement. Notes of judgment under Food and Drugs Act.

Public Health Reports, Volume 35, Nos. 9, 10, 11, 12, 13.

MANILA BUREAU OF PRINTING, Manila, P. I., 1919.

Report of the Philippine Health Service, for the fiscal year from January to December 31, 1918.

REPRINTS.

Perils from Faculty Postures, by J. Madison Taylor, M. D.

Fibromyositis of "Rheumatic Conditions," by J. Madison Taylor, M. D.

Tonic Spasm as a Cause of Disability, and the Remedy, by J. Madison Taylor, M. D.

Tremor, With Special Reference to Obstinate Types, by J. Madison Taylor, M. D.

Self-Regulation, by J. Madison Taylor, M. D., **Cardio-Vascular-Renal Regulation,** by J. Madison Taylor, M. D.

The Greater New York; Insured and Otherwise by Job. E. Hedges, General Counsel the Association of Life Insurance Presidents.

Salines Incidentally and Dorsey's Magnesia Solution with Fomula Particularly, by Samuel E. Earp, M. D.

MORTUARY REPORT OF NEW ORLEANS.

Computed from the Monthly Report of the Board of Health of the City of New Orleans, for March, 1920.

CAUSE.	White.	Colored.	Total.
Typhoid Fever	1	------	1
Intermittent Fever (Malarial Cachexia)	------	------	------
Smallpox	3	29	32
Measles	1	------	1
Scarlet Fever	1	------	1
Whooping Cough	------	------	------
Diphtheria and Croup	4	------	4
Influenza	48	27	75
Cholera Nostras	------	11	11
Pyemia and Septicemia	------	1	1
Tuberculosis	33	36	69
Cancer	22	8	30
Rheumatism and Gout	------	2	2
Diabetes	2	1	3
Alcoholism	------	1	1
Encephalitis and Meningitis	3	2	5
Locomotor Ataxia	1	------	1
Congestion, Hemorrhage and Softening of Brain	34	11	45
Paralysis	4	2	6
Convulsions of Infancy	------	------	------
Other Diseases of Infancy	10	9	19
Tetanus	------	2	2
Other Nervous Diseases	2	2	4
Heart Diseases	74	36	110
Bronchitis	3	2	5
Pneumonia and Broncho-Pneumonia	58	77	135
Other Respiratory Diseases	6	2	8
Ulcer of Stomach	2	------	2
Other Diseases of the Stomach	1	3	4
Diarrhea, Dysentery and Enteritis	15	7	22
Hernia, Intestinal Obstruction	3	3	6
Cirrhosis of Liver	3	3	6
Other Diseases of the Liver	1	2	3
Simple Peritonitis	1	------	1
Appendicitis	3	1	4
Bright's Disease	27	20	47
Other Genito-Urinary Diseases	11	12	23
Puerperal Diseases	5	2	7
Senile Debility	5	1	6
Suicide	4	------	4
Injuries	17	13	30
All Other Causes	43	22	65
TOTAL	451	340	791

Still-born Children—White, 27; coored, 17; total, 44.

Population of City (estimated)—White, 290,000; colored, 110,000; total, 400,000.

Death Rate per 1000 per annum for Month—White, 18.66; colored, 37.; total, 23.73. Non-residents excluded, 20.76.

METEOROLOGIC SUMMARY (U. S. Weather Bureau).

Mean atmospheric prssure..... 30.07
Mean temperature..... 60.
Total precipitation..... 3.28 inches
Prevailing direction of wind, southwest.